# SUPPLEMENT.


# The Mining Journal,

## RAILWAY AND COMMERCIAL GAZETTE:

**FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.**

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## THE MINING JOURNAL,

### Railway and Commercial Gazette.

*LONDON, JANUARY 27, 1872.*

### MINERAL WEALTH OF THE UNITED KINGDOM.

The Mineral Statistics of the kingdom for 1870 (delayed through unfortunate circumstances, which, it is hoped, will not again occur) have just been issued, and with reference to them Mr. Robt. Hunt, F.R.S., the Keeper of Mining Records, under whose superintendence they are compiled, states that there are but few points which require any preliminary notice. The steady and rather considerable increase in the production of coal, however, demands especial attention :—

In 1868 we produced 103,141,157 tons
„ 1869 „ 107,427,557 „ an increase of 3,286,400 tons.
„ 1870 „ 110,431,192 „ „ 3,003,635 „

In the same years our manufacture of Pig-Iron show a corresponding increase :—

In 1868 pig-iron made 4,970,206 tons
„ 1869 „ 5,445,757 „ an increase of 475,551 tons.
„ 1870 „ 5,963,515 „ „ 517,758 „

This will represent an increase in the consumption of coal for this manufacture alone of not less than 1,426,650 tons in 1869, and of 1,553,274 tons in 1870. The data for estimating the actual quantity of pig-iron which was converted into bar-iron, &c., are not readily obtainable ; but, in this manufacture 3 tons 7 cwts. of coal are required for the manufacture of each ton of finished iron, every operation included. We may, therefore, estimate an increase of at least 600,000 tons in the consumption of coal for this branch of iron manufacture. Our exports in 1870 show an increase of at least 742,933 tons. These quantities will very nearly account for the three millions of increase shown.

The iron ore appears to show an increase over the production of 1869 to the extent of 2,862,129 tons. This is not an actual increase. In the returns of former years a considerable quantity of calcined ore was reckoned as such, whereas it has all now been computed into raw ore. The relation between the ore raised and the pig-iron made is thus made to approximate much more nearly to the truth.

The returns of the tin-plate manufacture, which were first sought for in 1869, are not yet so complete as could be desired ; still the returns given approach more nearly to correctness, and, with the promises of future assistance before him, he is induced to hope that in the next issue of the Mineral Statistics this industry will be fully represented.

Mr. Hunt acknowledges his indebtedness to many of our large ironmasters, mine owners, and railway managers for the most important assistance. They have most liberally given much time and attention to his enquiries, purely with the hope of securing correctness for those national returns.

In order to permit of the movements of the several products to be compared, we subjoin a complete summary for the last two years, in explanation of which it may be mentioned that the value of the coal is calculated at the actual cost of raising, before any charges for movement are added. The salt is estimated at the value given in the return of the exports.

| Minerals. | Raised in 1869. Tons. | Value. | Raised in 1870. Tons. | Value. |
|---|---|---|---|---|
| Coal | 107,427,557 .. | £26,856,882 .... | 110,431,192 .. | £27,607,798 |
| Iron ore | 11,508,525 .. | 3,732,560 .... | 14,370,654 .. | 4,951,220 |
| Copper ore | 129,953 .. | 519,912 .... | 106,698 .. | 437,851 |
| Lead ore | 14,725 .. | 1,027,805 .... | 15,234 .. | 1,002,357 |
| Zinc ore | 96,866 .. | 1,189,030 .... | 98,176 .. | 1,200,209 |
| Tin ore | 15,533 .. | 49,366 .... | 13,586 .. | 41,058 |
| Iron pyrites (sul. ore) | 75,948 .. | 41,023 .... | 53,428 .. | 26,026 |
| Arsenic* | 2,561 .. | 11,464 .... | 4,030 .. | 17,739 |
| Umbers, ochres, &c. | 5,709 .. | 4,943 .... | 4,844 .. | 4,261 |
| Wolfram & tungs. soda | 25 .. | 323 .... | 51 .. | 653 |
| Manganese | 1,558 .. | 7,897 .... | 4,838 .. | 19,499 |
| Nickel | — .. | — .... | ½ .. | 27 |
| Barytes | 5,987 .. | 3,415 .... | 6,515 .. | 3,771 |
| Clays, fine & fire (estl.) | 1,200,000 .. | 450,000 .... | 1,200,000 .. | 450,000 |
| Earthy minerals, various (estl.) | .. | 670,000 .... | — .. | 575,000 |
| Salt | 1,250,000 .. | 687,502 .... | 1,489,450 .. | 744,725 |
| Coprolites (estimated) | — .. | — .... | 35,000 .. | 50,000 |
| Total value of minerals produced | .. | £35,252,120 .... | .. | £37,142,194 |

* Nearly 2000 tons of this arsenic will have been obtained from the burning-houses on the tin mines. A considerable quantity is produced at Swansea, of which no return has been obtainable.

Metals Obtained from the Ores Enumerated.

| | 1869—Tons. | Value. | 1870—Tons. | Value. |
|---|---|---|---|---|
| Iron, pig | 5,445,757 .. | £13,614,397 .... | 5,963,515 .. | £14,908,787 |
| Tin | 9,760 .. | 1,201,456 .... | 10,200 .. | 1,299,505 |
| Copper | 8,291 .. | 644,065 .... | 7,175 .. | 551,309 |
| Lead | 73,259 .. | 1,397,415 .... | 73,420 .. | 1,452,715 |
| Silver | 4,500 .. | 92,400 .... | 3,936 .. | 74,196 |
| Gold | 831,891 Ozs. | 207,972 .... | 784,562 .. | 196,140 |
| Other metals (estim.) | 18 .. | 62 .... | 191 .. | 750 |
| | — .. | 500,000 .... | — .. | 3,500 |
| Total value of metals | .. | £17,657,767 .... | .. | £18,486,802 |

Absolute Total Value of the Metals and Coal, with other Minerals, which are not smelted (except Building Stones, Lime, Slates, and Common Clays) produced in the United Kingdom in 1870 :—

| | 1869. | 1870. |
|---|---|---|
| Value of the metals produced | £17,657,767 | £18,486,802 |
| Value of the coal | 26,856,882 | 27,607,798 |
| Value of other minerals | 1,935,042 | 1,851,700 |
| Total value | £46,449,691 | £47,946,300 |

The returns altogether are very satisfactory as compared with those of the preceding year, especially when the commercial position of the metal market during the year to which the statistics relate is taken into consideration. Gold which had decreased to 62*l.* worth in 1869 had revived again to 750*l.* in 1870, and in the latter return there is a return of nickel (half a ton, worth 27*l.*) which was not represented in the former one. In referring to the statistics for 1869 it was noticed that the increase in the production of "other metals" from 5000*l.* to 500,000*l.* was very remarkable, and it was suggested that the difference probably arose from more complete returns having been obtained rather than from other causes. This, however, seems not to have been the case, for the "other metals" stand again this year at 3500*l.* only. It would be interesting to know of what this extra 500,000*l.* of metel raised in 1869 consisted. In future Journals details of the returns will be more fully referred to.

## Original Correspondence.

### OUR COAL SUPPLY.

Sir,—A scarcity of coal now prevails throughout the Cleveland district, being felt more especially since the middle of December, 1871. I believe other districts have also been subject to a restricted supply of coal, though not in so marked a way. The cause of its scarcity in the district of Cleveland has not been satisfactorily explained ; it is, no doubt, due in part to the colliers in the adjoining county of Durham not performing their work with the customary regularity ; it is said also to be in part owing to policy on their part in restricting the output of coal, whereby they seek to raise the price of their labour. However this may be, the fact is many of the blast-furnaces in this district have been going on half-blast, a large number of puddling-furnaces have been laid idle, and house coal has been sold at fabulous prices in Middlesborough and its neighbourhood. The impression now seems to be gaining in the public mind that the South Durham coal mines are becoming rapidly exhausted, which has, perhaps, long been foreseen by those more conversant with the trade. I know from personal observation that the Main seam is approaching a state of exhaustion, and the working of inferior coals, and seams of not more than 18 in. in thickness, is resorted to in order to keep up the supply. It is curious to observe how coke made from the Five-Quarter and other inferior seams is now taken by consumers without a complaint, when a few years ago the coke from the Main seam was not unfrequently not good enough for their purpose.

The extraordinary expansion of the iron trade of Cleveland is, no doubt, the main cause of the increased production of the South Durham collieries, and every available coal property is now being taken up in anticipation of a still increasing trade. It is evident that coals of the second-class are taking the place of those of the first-class, and the former now command higher value than the latter ; it seems, therefore, an argument unsound for any practical purpose to affirm that the Coal Commissioners should have distinguished the different classes of coal in their estimate—the first from the second and third, and so on. Consumers of house coal in the future will not only have to become familiar with any unpleasantness attaching to the use of second and third-class coals, but will have to pay an enhanced price for them. And this brings us to the question of economising coal, which will inevitably be forced more on our attention, and necessitate suitable arrangements as prices advance. The high prices consequent on scarcity will operate as a check to production beyond a certain limit, and iron manufacturers will eventually find coal and coke too costly to induce them to make further extensions in that trade. This state of things must be understood to take place at some distant period, when the continental coal fields will have been subject to a correspnding exhaustion with ours, but the beginning of a period of scarcity is evidently setting in with us ; it is, therefore, exercising a wise discretion if we endeavour to economise the consumption of coal at our collieries and household fires, so as to extend the duration of the coal fields to the time assigned to them by the Coal Commissioners in their report, which report we will proceed to demonstrate requires some modification on the two cardinal questions—of the depth to which coal may be worked, and the thickness of seam which may be worked to profit.

The working of coal seams of 12 in. in thickness, or even of 18 in., will hardly be practicable, unless accompanied with a bed of good fire-clay underneath, so that the two must be found in conjunction before the coal can be worked, and available to our supply.

As to the depth to which coal can be worked, without taking the commercial view of the question, when we consider that the natural temperature of the earth at 3000 feet deep is about 99°, which is 1° over blood-heat, we may conclude that with the present modes of conducting ventilation that temperature could not well be exceeded, and physiologists will tell us that even that temperature would not be compatible with any degree of exertion of the human frame ; so that if these premises are correct, the calculations made to a depth of 4000 ft., the quantities will not be realised in our coal fields. The Commisioners, it will be remembered, estimated that 146,000,000 tons of coal were still available, both from known and assumed fields, the estimate would thus require to be modified accordingly.

We are somewhat sanguine as to coal in considerable quantity being discovered under the newer formations, and worked to 3000 ft. deep, particularly when improved boring appliances have been successfully used to aid in the discovery of unexplored beds of coal.

*Jan.* 24. C. V.

### THE CHANNEL TUNNEL PASSAGE.

Sir,—However gigantic this scheme appears to be in the opinion of some, I am a believer in its practicability and ultimate success. Much as has been said in favour of a "ferry boat" sufficiently large that the train, with all its passengers and luggage, may be transported across upon it, without changing or loss of time, as in America, crossing the Mississippi, the Hudson, and the Missouri rivers, where this kind of transit is carried out very successfully (and in fine weather and smooth water this arrangement might do in the present case, although the distance is upwards of 20 miles), but taking the channel in all seasons of the year, with its rolling and tossing, and strong currents, I do not consider it practicable, and, besides, not capable of supplying the advantages sought—to avoid sea-sickness, the dangers and exposures to the sea, and length of time occupied in the passage. Moreover, I do not see an equivalent for the enormous amount of expenditure required in building these ferry-boats and improving the landings, and working expenses, allowing nothing for wear and tear. Therefore I think scientific engineers should, one and all, give in their support with the other engineers and promeiers of the tunnel scheme. I am proud to find that an influential company has been formed, and preliminaries completed, for raising the necessary capital for commencing operations ; and, once commenced, I have no doubt as to its completion. All inconveniences in the passage will then be removed, and a permanent communication opened up between these two countries that would not only benefit but bestow upon the public a great comfort, as well as make the distance between France and England a short and pleasant journey. A Miner.

### TONNAGE CAPACITY OF SMELTING FURNACES.

Sir,—In answer to an enquiry made by one of your correspondents in the Supplement to the *Mining Journal* of Dec. 2 as to how many tons of ore could by any possibility be smelted in a 40-ton furnace in a given time, I beg to state that the capacity of a furnace like those used in this country depends upon—

1.—The character of the ore.
2.—The kind of fuel used.
3.—The construction of the furnace, and its size.
4.—The quantity of blast introduced—*i.e.*, upon the number of tuyeres and the areas of their openings.
5.—The pressure of the blast.

The new furnace of the Utah Silver Mining Company, built after the pattern of the Eureka Consolidated Company's furnaces, with seven 3½ in. tuyeres, will smelt 35 tons of Bingham Canon lead ore per 24 hours, the blast being under a pressure of ¾ lb. to the square inch.—*Eureka, Nevada, Dec.* 27. O. H. Hahn, M.E.

### REMARKS ON THE ORIGIN AND FORMATION OF METALLIFEROUS VEINS.

Sir,—It appears to me that if correct views could be arrived at respecting the source of metalliferous minerals, and the channels by which they are conveyed to the respective fissures which contain them, something satisfactory would be gained, even if no further information serving as a guide to the miner in his devious underground pathway resulted. Every demonstration of our ignorance augments not only our own but the general stock of knowledge, provided it be recognised and applied to that end. In no department of natural science is light more needed and knowledge more desirable than in that relating to exploratory mining, and, I might add, more susceptible of a useful application. That the subject is beset with difficulties everyone connected with practical mining knows, and many by much pecuniary disadvantage.

If axioms sufficiently correct could be laid down and observed as a general basis regarding the formation and filling of metalliferous veins, a theory more consonant, comprehensive, and satisfactory than that relating to the effects of individual contiguous strata on the lodes might be constructed, and from it comparatively correct inferences might be deduced. Mining as an industry has long since risen to an importance second only to that of agriculture, and beyond which it will never be permitted to go. Although agriculture depends for what it is, and for what it ever will be, in advance of its present condition on mining, their reaction on one another is inevitable, and mutually beneficial, and the advancement of either may be regarded as the prelude to the progress of the other, as long as revolving time shall continue to develope higher scientific attainments and a sounder practical experience in man, in all that pertains to the arts and industrial pursuits generally.

It is only lately that the attention of even those interested has been directed to mining with anything commensurate with its importance. Capricious maxims remarkable for nothing but a sort of superficial quaintness, mere truisms, such as "where it is, there it is," and "to find all the ores you must explore all the ground," &c., were truisms for a long time regarded as unanswerable propositions, and to quote either of which was taken to veto the presumptive interrogations of minds tainted with anything like philosophical ideas, after which it was supposed that nothing was left to be said. These notions were entertained not merely by the uneducated class of miners, but by those at the head of their profession—that is to say, the most popular men of even the generation just receding, who were entrusted with the management of our largest mines, and whose *ipse dixit* was considered final in all matters pertaining to the value of mining, whether prospectively or intrinsically.

Crude theories also were entertained regarding the formation of metalliferous veins, some believing implicitly that the earth was formed as we now find it in seven natural days, literally interpreting the Mosaic account of the Creation, and that no change has since taken place in its internal structure or its external contour, nor in the relative position of the several rocks to each other which comprise its crust. Nor these, again, to the metalliferous deposits which they mature and enclose, but that the earth is an inherently inert mass, unsusceptible of the motions of any of its individual particles without an external mover, and that, therefore, all things continue as they were from the beginning. Others there are who believe that the fissures which contain the metallic minerals were disrupted by igneous agency, and subsequently filled with their several ingredients by the same agency. Another class still—"that the fissures were formed by the contraction of the rocks from the surface by either the evaporation of water, or the radiation of heat previously contained therein, and that they were subsequently furnished with their present contents by infiltration from the surrounding rocks." It is rarely that we find notions entertained of natural science by any appreciable number of individuals which has not the germ of truth in it, but one of these we have mentioned must be set down in that class, not having the semblance of truth to support it.

On examination of the several theories which have been entertained in relation to this subject, and the basis, if any, upon which they individually rest, or contrasted with facts as they disclose themselves in nature, and appeal to our individual reason for endorsement or otherwise—"as to the relation in which they stand to other facts equally patent to the senses, but unaccountable as to their origin, except they be associated by the 'chain' of induction as cause and effect"—may aid us in arriving at approximately correct ideas on this very interesting and equally important subject. And this I propose to do—you kindly permitting me—in two or three consecutive communications, aided by whatever sources of communication may be opened to me agreeing with the facts of my own personal observation and experience.

It is inferable from what has already been stated that the laws which obtain in this department of nature, if properly understood, would constitute the foundation of reliable scientific induction, and it may here be added that without which no theory can ever have a sufficient basis to rest upon. It is presumably commonly the case that many theories, so called, are nothing better than fancies, idle superstitions, having no foundation in fact, no analogy in nature.

It is almost needless to say that to this class the first theory mentioned in my preliminary remarks belongs, and, therefore, falls legitimately into the category of assumptions, and as such merits no further notice in this connection.

My remarks—if proceeded with—on the igneous theory respecting the formation of metalliferous veins, would protract this communication to too great a length, I will, therefore, reserve them for my next. ROBERT KNAPP.

*Ellsworth, Nye County, Nevada, Dec. 27.*

## MINERALOGY—No. II.

### METALS:—THEIR HISTORY, CHEMISTRY, GEOLOGY, PHYSICAL PROPERTIES, USES, AND COMMERCIAL IMPORTANCE.

SIR,—It has been remarked that though Moses was well acquainted with the metal iron, there exists no reference to its employment in the construction of the tabernacle in the wilderness; nor yet is it referred to in the minute details given of the building of Solomon's temple. Metaphorically the Jewish lawgiver names iron in his various addresses to the people over whom he had charge. Thus he compares their deliverance to being "brought forth out of the iron furnace;" and speaks of the Egyptian bondage as "a yoke of iron." The sternness of the Omnipotent to the disobedient he proclaims in one passage as "the earth beneath being as iron," and in another, "the heaven above as iron." That iron was employed as an offensive weapon we gather from the denunciation against the homicide, "And if he smite him with an instrument of iron, so that he die, he is a murderer; the murderer shall be put to death." Lastly, as employed in domestic economy, it is recorded that "Og, the king of Bashan, had a bedstead of iron."

The Greeks appear to have been much behind the Egyptians in the knowledge of working of iron, as at the Trajan war, which occurred several centuries after the time of Moses, the heroes are represented by the poet Homer as being armed with swords of copper, hardened with tin. I must digress to observe that here occurs very early and reliable evidence of the intercourse of civilisation with the supposed barbarism of Britain. Cornwall alone supplied tin to the world, and the Phœnicians, who for more than 1100 years before the Christian era traded with the inhabitants of that county, conducted a profitable trade in importing its stable produce into Greece, and thus Cornwall first acquired commercial importance in the ancient world, before any other portion of this kingdom appears to have been discovered. Homer flourished some 900 years B.C. The bronze swords to which he makes allusion unquestionably owed their existence to the nautical skill and indomitable business habits of the Syrians, and the immemorial mining habits of ancient *Kernow*. This most distinguished epic poet renders further illustration of the scarceness and concomitant value of iron, when in reciting an account of the Olympic games, he sings:—

"Then hurl'd the hero, thund'ring on the ground,
A mass of iron (an enormous round),
Whose shape and size the circling Greeks admire,
Rude from the furnace and but shaped by fire.
This mighty quoit Aëtion wont to rear,
And from his whirling arm dismiss in air:
The giant by Achilles slain, he stow'd
Among his spoils this memorable load;
For this he bids those nervous artists vie
That teach the disk to sound along the sky.
Let him whose might can hurl this bowl arise,
Who farthest hurls it takes it as his prize:
If he be one enrich'd with large domain
Of downs for flock, and arable for grain,
Small stock of iron needs that man provide,
His hinds and swains whole years shall be supplied
From hence, nor ask the neighb'ring city's aid
For ploughshares, wheels, and all the rural trade."

From this we see the allocated prize in this masculine test of strength and dexterity was a ball of iron of dimensions sufficient to furnish him with implements of husbandry for a long period of time.

It is rather a curious fact, and yet more conclusive of the scarcity of iron about this period, that those enterprising navigators, the Phœnicians, employed in their shipbuilding nails and bolts constructed of brass, whilst their anchors were of lead.

At a little later period the method resorted to in the formation of steel assimilated with that very recently employed. The iron, purified by repeated melting, and deprived of a portion of its carbon, by being kept long in a state of fusion, was converted into steel. Again, they buried forged plates of iron in the earth until the more feeble parts of the metal were consumed. Of the remainder, or firmer portions, they made swords and other weapons, such that "neither shield, nor helmet, nor bone were able to resist them." A similar process obtains in Japan at this day. The iron is there buried in marshy ground till a great part is oxidised; it is then taken up and forged, and again submerged for eight or ten years; when the remainder is found converted into a species of steel, of which they construct ploughshares and other tools and weapons. The sabres thus formed are said to be pre-eminently good, and of such excellent temper that they will cut through a nail without injury to their edge. Cast-iron immersed in salt water for a long time is supposed to be converted into plumbago; a modification of this action may result by lengthened contact with the soil.

That there are contingencies which affect the constitution of iron in a manner analogous to this, and which are equally inexplicable by known chemical laws, is evidenced by records; the interest attached to them fully justify their narration in this place, rather than when we have under consideration the chemistry of the metal. I quote from the "London Encyclopædia." Mr. McCulloch asserts that a certain portion of plumbago found in pig-iron adds considerably to its toughness. This gentleman states that on one particular occasion a cannon had been condemned for some fault in the bore, and it was found so exceedingly tough that none of the men were able to break off a trunnion, as is the usual practice in these cases, when three or four blows of the sledge were commonly found sufficient for the purpose. He was induced, therefore, to examine this specimen, and was surprised to find that it not only contained a most unusual proportion of plumbago, but that it was in what he called a disintegrated state. (This term for want of a better.) The plumbago was not only visible on breaking the metal, giving it the appearance of having been rubbed with powdered black-lead, but the iron was capable of leaving its trace on paper. He neither before nor since ever met with another example of this kind. The remaining guns, which must have been made of the same metal, went on service, and some of them are probably still existing. He entertained no doubt they were the best that had been received during the war; and he considered it would have been very desirable to have discovered by what means this very uncommon specimen of gun-metal had been procured, as its toughness is a matter of such importance. He does not pretend to account for this singular state of the iron; as, although the presence of plumbago was sufficient to affect the colour of the iron, it was never, bating this instance, distinctly visible, so far as his experience went. Yet in gun-metal, he adds, it is easy to conjecture its presence and proportion by the colour of the fracture, which is darkest or most gray where it is most abundant. The trials which he made also go to prove that the grayest metal is the toughest, although I know that many ironfounders consider that gun-metal may be too gray, and they act on this principle in the assortment of the pigs for the reverberatory. Again, after referring to the apparent conversion of pig and cast-iron into plumbago, which he remarks is most particularly observable in pipes in porter breweries, calico-printing houses, and gas manufactories, the encyclopædist records that "after Capt. Roe had invented the diving-bell, he joined Sir Archibald Grant, a great speculator of that day, in coal mines and other matters, in an attempt to weigh the Florida, one of the Spanish Armada, which had foundered off the coast of Mull, near the entrance of Tobermory harbour. This attempt, which took place in 1740, was unsuccessful, as far as related to the ship; but some guns, both brass and iron, were brought up. The former, whether they belonged to the Spanish vessel or not, had the mark of English founders, R. and J. Phillips, 1584, with a crown and E.R. on them. The iron guns were deeply corroded; and on scraping them, it is said, they were found so hot that they could not be touched, and they did not become cold till they had been two or three hours exposed to the air." Though the rationale of the beneficial action of moisture, atmospheric air, and sea-water, is, like many other latent causes of curious effects, still unsolved, it remains a fact that many of our artizans still resort with marked advantage to these expedients, and if asked for a reason they simply assign the one which the sterner sex are only too apt to regard as the peculiar attribute of the weaker vessels—"It is so because it is;" thus the scissor-smith frequently effects the partial oxidation of his intractable steel prior to punching the whole for the formation of the bow, and the rural blacksmith finds in an old cramp, a rusty horse-shoe, or a partially decayed hook, the metal best adapted for an article demanding extreme tenacity. Returning to our historic records, and more particularly to those portions which have tended to raise Great Britain to its position as the principal iron-producing country in the world. Much doubt exists as to the period when the attention of its inhabitants was first directed to this source of its future greatness. At the invasion of Julius Cæsar he found the ancient Britons in possession of not only the trivial articles of money and rings made of iron, but the more formidable and conclusive arguments in the contest which ensued upon the irruption of personal arms, and these, too, weapons of no ordinary character, together with chariots equipped with scythes and hooks. It is surmised by some commentators that these weapons were of brass; but why not of iron? the metal of which their ornaments and currency were ingeniously constructed, and in the working of which doubtless they received practical instructions from their constant visitors, the Phœnicians. However, it matters not. One thing is clear, our progenitors must have been apt scholars if they did not possess the skill of working iron previous to the arrival of the Roman legions, as we find them in an incredibly short space of time after that inroad, actively employed in turning to good purpose the natural advantages of their position. The Forest of Dean is mentioned in Camden's "Britannia" as the earliest seat of the iron trade, and here still remain remarkable evidences of primitive forging operations. A more congenial site could scarcely have been selected. Teeming in ironstone, indications of which are evidenced by the ferruginous appearance of the watercourses which flow through it, and abounding in primeval forests, it must have attracted the earliest attention of the smelter, and have induced to the selection of the locality for this purpose. Birmingham and Sheffield would appear to have been very early chosen for the commencement of those industrial employments which have since secured them a world-wide reputation, as at several of the ancient bloomaries are yet to be picked up Roman coins and other indications of those powerful people.

It is a gratifying reflection to think that though, of necessity, in the turbulent ages which succeeded the exodus of the Romans the manufacture of warlike implements would take the precedence, they were not the only articles thus put in requisition, as we find that during the heptarchy, upon the accession of Edwin to the throne of Northumbria, he had a number of iron vessels forged, which he caused to be fastened with chains beside the various springs and fountains in the routes generally frequented from one town to another for the convenience of wayfarers. Hence the earliest instances of English water-fountains. At the time of the Norman Conquest the art of working iron must have been advanced to a state of great perfection, as we find Harold's army well supplied with all necessary armament—offensive and defensive—swords, spears, and armour; and so advanced was the art of working iron about this time "that even the horses of some of the chief knights and barons were covered with steel and iron armour. Artificers, also, who wrought in iron were so highly regarded that every military officer had his smith (or armourer), who constantly attended his person, to keep his arms and armour in order. The chief smith was an officer of considerable dignity in the court of the Anglo-Saxon and Welsh kings, where he enjoyed many privileges, and his *weregeld* (or pay) was much higher than that of any other artificer. In the Welsh court the king's smith sat next to the domestic chaplain, and was entitled to a draught of every kind of liquor that was brought into the hall." *Au revoir.*

*Laboratory and Assay Office,* W. WHITE.
*25, Finsbury-place, E.C.*

## THE PRESENT SYSTEM OF MINING.

SIR,—Much has been said and written of late in reference to the "Five-week months system." In my humble opinion, however, this is not the chief cause of complaint among the miners themselves. How frequently do we see in mine reports bargains set to so many men at a certain price per fathom, stinted just enough to allow them bare wages. This amounts to nothing more nor less than owners' account tutwork. The men quite understand that if the ground turns in their favour they must "hang on the chain," or the price will be cut down at the next setting. This is not altogether the agent's fault, as in order to keep his situation he is obliged to measure and make up the cost before he re-sets the bargain. The shareholders scarcely ever enquire how much ground has been opened up, but how much money per man the cost sheet will amount to, and whether more than the average of the country at large.

The writer of this once, with five others, took a 12-fms. lift, to sink below the 60, the water to be drawn to this level in barrels. We had a fair price in sight, and were earning good wages, but the ground turned in our favour, so that we could get more than the mine was in the habit of paying. The poor agent, to prevent this, had the engine stopped every Saturday afternoon to change a brass, or to do (as we were told by the engineer) some unnecessary work, simply to give us a core round at the tackle for draining off the water, which certainly could be no benefit to the shareholders. Another hard case; eight men take two levels to drive on the course of the lode from a cross-cut, at the same price. Four of them work hard and average good wages for three months, when the price was cut down so low that it was impossible to earn more than 2*l.* 10*s.* per month. The other four men worked easily, kept up the price, had their chat, smoked their pipes, and called the others fools. These are not solitary cases; neither do I think all mining is conducted on this principle, as no doubt in paying mines the agents are able to act differently.

I think this could be remedied by giving a month's stint, and paying the men what they earn, whether little or much, without the system of making up. Should the agent not be satisfied with any pare of men's labour, he could remove them to some other part of the mine, and put others in their places, or, to prevent any jealousy between the men, in most cases it would be advisable to change them once a month. By these means good labourers would have fair play, the others could not complain, and the shareholders would reap the greatest benefit by having more work done for the money.

MINER.

## THE MINERS' WAGES MOVEMENT.

SIR,—When I a short time since urged the necessity of a large attendance of mine adventurers at the Truro meeting I was quite sure if this course were not adopted the legitimate meeting would be swamped by parties having no real interest in mining, and this has proved to be the case. Landowners, clergymen, shopkeepers, and itenerant drapers, all with gift of speech, attended, and exercised their influence; and, this being the fact, it may fairly be asked upon what principle of right, honesty, or fair play they deemed themselves justified in entering a meeting called for a specific purpose—the consideration by the adventurers and their agents of certain proposals submitted to them by the men at different mines in Cornwall and Devon.

The largest and most influential portion of the meeting were decidedly opposed to the propagation of the new scheme, but in these modern days it would seem that masters have but slight control over their own affairs. What fair or impartial conclusion can ever be arrived at if the men and tradesmen to whom they are in debt are permitted to force themselves into the presence of the masters at the moment their own petitions are being considered, and, in opposition to the wishes of the masters, pass resolutions to suit their own views?

Passing aside the meeting, and the peculiar mode of procedure adopted thereat to effect a certain object, I would call attention for a moment to a fact connected with the adoption of the four-weeks month principle at Virtuous Lady, a mine in Devonshire. In last week's *Mining Journal* the agent, in his usual weekly report, states—

"In consequence of the adoption of four-weeks payments the holiday following the setting-day is done away with, and only three holidays to be allowed in the year, the men also to work full time on Saturdays, as on other days."

According to this arrangement, it is clear that calculating the six days per annum for the holidays after "taking-days," three holidays to be given up that are now enjoyed, and (say) an extra couple of hours' work every Saturday, making 13 days in the year, the whole will amount to 22 days per annum.

Now, as it is well known to every practical man that it makes no difference whatever, in the long run, in the amount of wages whether they are paid in periods of 12, 13, or 30, it simply follows that in this case the miner will have to work very nearly a whole four-weeks month every year for nothing more under the new system than he did under the old.—*Jan.* 24. AN ADVENTURER.

## EBERHARDT AND AURORA MINING COMPANY.

SIR,—It is now a year and a half ago since I first ventured, through the medium of the *Mining Journal*, to throw some doubt on the exaggerated statements and wild anticipations of profit put forward by the directors of the company at their first annual meeting. Without claiming to have any special knowledge in the matter, save as a former resident of Nevada, in constant communication with reliable parties there, I pointed out that the history of the White Pine district, brief as it was, utterly precluded the idea that the inflated hopes indulged in by the promoters and directors of the Eberhardt and Aurora Company could by any possibility be realised.

It may be fresh within the memory of some of your readers that I was roundly taken to task at the time by one of the directors of the company, who endeavoured to show that I was absolutely and entirely wrong, and that the directors were absolutely and entirely right. My reply to this was that "it was simply a waste of time now to answer every mere assertion and statement put forward to contradict absolute facts, however unpalatable those facts may be."

A year and a half has gone by, and how does the case stand to-day? The price of the shares was then about 13*l.*; since then they have been up to 42*l.*, and are now down to 7*l.* What is the result of the year and a half? Beyond this time, and into the future, there is no necessity to look, for the gilt has been taken off the gingerbread, and the "beginning of the end" has already come. From the original purchase of the Eberhardt and North Aurora Mines I defy anyone to show to demonstration that $1 of profit has ever been realised by the company. From the Ward Beecher—that sop in the pan thrown to the shareholders by the vendor, in the furtherance of his own interests—a profit apparently has been made, and one dividend declared.

And this is the be all, and the end all, of all the visions of untold wealth and the self-laudatory congratulations indulged in at the meeting of July 12 last, of all the twaddle about chloride ores, which no schoolboy in Nevada would have uttered, and of the magniloquent assertions, "I intend to stick to the ship till we get $20 a ton profit from $40 ore," "We have a scientific chairman, the wire tramway is science, the large mill is science." This, I say, is the end of it—that the Eberhardt and Aurora Company is left saddled with a property for which (mine, mill, and tramway) no sane man in Nevada would give 25,000*l.*!

It is no use now to mince matters, and I am well content to abide the issue of what I write to-day, as I have waited until now for the fulfilment of my first predictions. The Eberhardt and Aurora Company is worth just what its assets are worth after payment of its debts, for not $1 of dividends will the company again realise from the working of its mines, without fresh discoveries. This may be a bitter pill for those to swallow who were induced to purchase their shares at high prices, on the statements put forth by the "blind leaders of the blind;" but it is a bad, black business from beginning to end, and no amount of gloss will brighten it now. It is the history, not of the Eberhardt and Aurora alone, but of three-fourths of all the companies formed in England for working mines on the Pacific coast, and every honest and unbiassed resident on that Pacific coast will endorse what I say.

Thus the curtain falls on the first act of the farce of the Eberhardt and Aurora, and of its neighbour, the South Aurora. The English public are hard to be convinced, and the shareholders will doubtless throw away more good money in the endeavour to seek and save that which they have lost; but though they may prolong their agony for a time, and endeavour to let themselves down easily in the struggles of hope deferred, the curtain will ere long fall again on the closing, winding-up scene.

A few more words, and I have done. This bitter business is, as I have already said, a type of most of the American mining schemes introduced here. In most cases, as in this, the directors are honourable gentlemen, above even a breath of suspicion, their one fault being that, partaking of the gullibility of John Bull, they accept everything favourable they hear for gospel, and disseminate it as such, wilfully rejecting every disinterested word of warning given to them. The history of the Eberhardt and Aurora, and South Aurora Mines was well known on the Pacific coast when the properties were sold here, and everyone on the coast who looked at the matter with unbiassed judgment knew it could end but in disastrous failure; but the directors and shareholders thought they knew everything, as many have thought before them, and the result is before us. P.

*London, Jan. 24.*

## MINING IN NEVADA, UNITED STATES.

SIR,—There seems to be a misunderstanding with respect to the different mines in Nevada, and I do not see that anyone will try to give a fair understanding to parties interested in them. I have seen several letters written to England on the mineral wealth of Nevada, and, to illustrate what is said, the writers take some of the mines on the Comstock lode, and some in the Meadow Valley mining district. Now, parties reading such reports are led to believe that other rich mines at present worked in this State are like the Meadow Valley and Comstock mines—good, permanent mines; but that is the mistake. Most mines in this State are as different from the Comstock and Meadow Valley mines as day from night.

But, as I have said, there are other good mines besides the two places mentioned, such as the Eureka mines, and some of the mines on Treasure Hill, and other places in this State. The difference between the last mines mentioned and the Comstock and Meadow Valley mines are that the Eureka and White Pine mines are lime-rock deposits, and the others are fissure veins. I need not explain the character of those fissure veins, as they are like most other fissure veins, sometimes rich and sometimes poor; but whether rich or poor, large or small, the fissure is always there. Some of the mines on the Comstock vein have attained a great depth, and are still rich mines; but mines on the Meadow Valley vein are not so deep as mines on the Comstock, for this reason, that they are newer discoveries than the Comstock, but in all probability will be just as good to a depth of several hundred feet as they are at present.

But other mines that are so frequently found in this State, and also in Utah, such as the White Pine mines, Pinto, Eureka, Belmont, Mineral Hill, and several other places are lime-rock deposits. A lime-rock deposit is simply a nest of ore in the lime, and, unlike fissure veins, they do not attain a great depth, and are speedily worked out. Never in any of those camps has a second deposit of ore been struck under the first one, but by drifting on at the same level other deposits of ore may possibly be found, not at the same level through the mountain, but at the same depth under the surface of the mountain. After the first deposit has been worked out there is nothing to follow or lead to another deposit, whereas in a fissure vein you have always the fissure to follow after the rich ore has been worked out. Lime-rock deposits are more extensive in some places than others—i. e. they are large bodies of ore. The Ward Beecher chamber, White Pine, is the largest chamber of ore yet discovery on Treasure Hill, and was also a very rich deposit; but in sinking under the ore in the Ward Beecher chamber there were no signs nor traces of another deposit under; consequently sinking was abandoned, and a drift drifted at the same level as the first deposit, without any leader or signs of ore to guide; and after drifting 100 ft. or more through the lime-rock ore was again struck, but whether it is extensive or rich has yet to be proved.

There have been other sinkings on Treasure Hill, but no second deposit struck further down, whereas most of the surface of the western slope has been undermined; there were also rich mines there but are now worthless, the ore being taken away. Also at Mineral Hill several of the rich deposits have been worked out, and shafts sunk under some at the depth of 60 ft., and drifts drifted at the bottom of the shafts, still no second deposit of ore struck, nor any signs or traces that the explorer can follow to find a second deposit in depth. True, in the curious formations in which mineral is found in the

State (Nevada) nothing is impossible, there may possibly be a second and third deposit of ore further down; but, as there are no traces or leaders to follow, it is a matter of chance whether they will ever be found, and how great a depth must be attained before they can be expected to be found no one can say; it may be 100 ft., more or less, probably never.

It appears that deposits lie in the uppermost stratum, or near the surface of the mountain, and when a new deposit of ore is struck it has always been near the surface, and oftentimes there is no trace to lead to the ore, but at other times it shows croppings, and sometimes a very rich body of ore at the surface. Then why give the Comstock and Meadow Valley mines as an illustration of mines in Nevada? The only reason I can see is to get capitalists to think that the other mines are as permanent as those spoken of, in order that they may invest their capital in some of the Nevada Mines, and how often we see English companies purchasing mines after other companies have worked out the best of them, and can see their mine is nearly worked out. Several instances could be mentioned of English capitalists defrauded in that manner, and all through sending someone to inspect the mine who does not know a deposit from a true fissure vein. Instances have been known where parties sent out to inspect mines have been bribed to give a good report, and the company that sent them out pay large sums of money for a mine that is hardly worth owning. But companies should be very careful of buying those lime-rock deposit mines, as they show rich ore, and, to the inexperienced eye, any amount of it; but they are all speedily worked out, some sooner than others, according to the size of deposit, and the speed by which it can be mined, unlike the Comstock lode, that has been worked for years, and in all probability will be worked for years to come.

THOMAS H. WHITE,
Formerly of Penaliva, Cornwall.

*Mineral Hill, Elko County, Nevada, Dec. 22.*

## MINING IN NEVADA—THE MONITOR MINE.

SIR,—You would much oblige by inserting in the *Mining Journa* the enclosed remarks respecting the Monitor Mine.

*Austin, Nevada, Dec. 23.* SUBSCRIBER.

THE MONITOR MINE.—The mines in the vicinity in Belmont, in Philadelphia district, have doubtless received less attention from capitalists than any mining property of equal merit in the State, but very little noise has been made about them, the owners contending themselves with working their ledges quietly, extracting the ore, and when the mill was not in operation at Belmont shipping the rock to this city to be worked at the Manhattan mill, always resulting, notwithstanding the extraordinary cost of transportation, in healthy returns to the owners. For a mine about which so little has been said or written, the Monitor offers better inducements to capitalists than any mining property within our knowledge in Eastern Nevada. The property of the company consists of between 1500 and 1600 feet, comprising the Monitor and Independence locations. A tunnel tops the ledge at a distance of 250 feet from the surface, showing a well-defined ledge from 3 to 15 feet in width, with well-defined walls on either side. The ledge has been prospected a distance of 400 feet in length by drifts and winzes and to the depth of 50 feet below the tunnel, exposing a well-defined ledge the entire distance, averaging in thickness as above stated, nearly all the rock being good milling ore, assaying from $50 to as high as $4000 per ton. As appears by the books of the Manhattan Company, 160 tons of ore worked at their mill within the last four months for the Monitor Company yielded over $71,000, being an average of $444·44 per ton, and returning to the owners a net profit of over $45,000, in addition to which several hundred tons of ore of a lower grade that will not pay for freighting to this city remains upon the dump, the owners intending to erect a mill in the spring, when it can be profitably worked. The company by milling their own rock will save thousands of dollars now paid for shipping to this city, a distance of 86 miles, besides saving the expense of assorting, as nearly all the ore taken from the mine will pay handsomely for working, when not attended by the heavy freight charge above mentioned. The location of the property is most favourable for successful working, as wood is plentiful and cheap, and the ledge being situated on the side of the mountain affords good drainage for tunnels and easy conveyance of the ore from the mine to the mill. The above figures were taken from the books of the Manhattan and Monitor Companies, and the particulars in regard to the present appearance and condition of the mine furnished us by a gentleman of our acquaintance who is a thoroughly practical miner, and in whose statements the utmost reliance can be placed. There are other mining properties in the vicinity of Belmont which we shall notice from time to time as we receive reliable information in regard to them, or are enabled to give a correct account from personal observation.—*Reese River Reveille.*

## THE PINTO SILVER MINING COMPANY.

SIR,—The Pinto Company have received notice of the successful starting of their mill and Stetefeldt furnace, and first shipment of bar silver, 2000*l.* I have a word to say to my fellow-shareholders in the Pinto. From the first organisation of the company I have been interested in it, and have since devoted a good deal of time to the investigation of the value of the property, and the character and position of parties connected with it. I found all the statements put forth by the vendor to be strictly true, and that we have men of undoubted integrity engaged at the works, men who fully understand their business, and who were able to give satisfactory security for the safety of the company's funds. I have seen private letters from the agent of the Bank of California, who had, for the benefit of a friend in London, examined the ore, saying (Dec. 7) that there was ore raised which he valued at from $125,000 to $150,000. I will say, in addition to this, that the cost of all the works, and the amount expended in opening the mines, the buildings, and plant, was amply covered by the paid-up working capital, and the company are now receiving bullion on profit account.

I say, watch these companies. The Pinto Company purchased the mines on verification of the vendors' statements, and by advice of the best mining experts to be found in Nevada. I do not think the directors or promoters belong to that class of men who would buy a property for the purpose of speculating on their friends or the public if one of the Nevada experts had advised them not to take it, as was the case of the Utah. (I speak of this, as engineers sent out from England reported it to be "better than represented.") But I say let us watch all these new companies; give credit where it is due, and, if we want genuine good things in the way of mining schemes, let us look a little to the character of the parties connected with them, both at home and abroad. Let the directors of mining companies give us public statements, as the Eberhardt and Aurora and Utah have just done, to show if they are making a profit or loss by working their ores. I know that the Pinto directors court enquiry, and that they feel not only safe but strong in their position, having the advice of a most reliable man in Nevada, one who not only understands his banking business, but is also well up in mining and the reduction of ores. Had some other companies advised with a man of his position we should have had fewer swindles, certainly not one like the Great Western. A PINTO SHAREHOLDER.

## "WHAT TO SELECT—WHAT TO AVOID"—No. IX.

SIR,—Last week I alluded at some length to the incalculable amount of mischief mining—and especially foreign mining—sustains by the unsound principle now so prevalent of appropriating the larger proportion of the subscribed capital as purchase-money, thus reducing the working capital to the narrowest limits, and involving the always disagreeable necessity of raising further capital, to the permanent detriment of that originally subscribed. This pernicious principle would appear to be of comparatively recent growth, for the older companies—St. John del Rey and Port Phillip—although each has had manifold difficulties to surmount during its earlier career, have been spared "the ignoble humility of pecuniary embarrassment." At least, in so far as they were never compelled to seek additional capital upon onerous terms.

The St. John del Rey, it is true, expended its capital upon a property that proved an utter failure; and at the eleventh hour fortunately secured Morro Velho, whose revenue paid its entire development cost, and divided among its shareholders about 900,000*l.*, upon a capital of 115,000*l.*, the whole of which, as I have just said, was fruitlessly expended upon the unproductive mine acquired at the formation of the company. Morro Velho has given profits of 100,000*l.* a year, and was yielding something like that amount when the disastrous fire occurred in 1868. That dire calamity—notwithstanding the commendable efforts of the executive to re-open the mine by two vertical shafts—has, I fear, rendered the property valueless to the majority of the existing shareholders. It must not be forgotten that the reserve fund of 48,000*l.* was confidently calculated to be ample to sink these new shafts to the required depth of 150 fms.; but this entire amount has been absorbed while yet each shaft has to be sunk 50 fms.! Apart from the grave fact that an unexpected influx of water has appeared in the new shafts, coming there is too much reason to apprehend from the old mine, where in the enormous cavern excavated there must of necessity be an immense body of water. Apart, I say, from this grave fact, to overcome which will incur an additional outlay not easily estimated, it is more than questionable whether the uncalled capital of 55,000*l.* (5*l.* per share) would have been anything like sufficient to accomplish such a gigantic undertaking. While, however, all true lovers of mining must deeply deplore the present sad condition of this once celebrated mine, those associated with the origin of the enterprise must have been much more astute and far-sighted—perhaps the better term would be not so inordinately overreaching—in providing a working capital to meet every ordinary demand.

The same salutary precaution was taken at the inception of Port Phillip, and it is very certain that if the same thoughtful head—for both companies owe their origin to the late Mr. J. D. Powles—provided for an abundant working capital, this enterprise would have come to an untimely end, for when struggling through its greatest difficulties, and its prospects were so cheerless that the question of winding-up was seriously entertained, had it been necessary to find more capital the shareholders would not have subscribed it, and a collapse would have been inevitable, thus losing a property that has since returned a net profit of 135,000*l.*

The career of these two companies, their almost overwhelming difficulties and struggles, and their final attainment of success, should be exemplars to shareholders in foreign mines. Need I refer to the present position of Eberhardt and Aurora? It is not, however, my present intention to discuss the question as to the advisabilty of having constructed the wire-tramway or the 60-stamp mill, suffice it to say it is clear that, like all similar companies, this has its difficulties to surmount. If there be sufficient ore in sight in one mine alone to keep the 60-stamp mill in full operation for twelve months, and upon ore of the average assay value of $50 per ton—and the manager, Mr. Phillpotts, has told us there is—it certainly requires some explanation as to the reason that a loss has resulted for November and December, the more especially when we are told that the tramway and the International Mill are both in full operation.

SOUTH AURORA.—Six weeks since I wrote as follows:—"South Aurora shares are neglected, even at their present heavy discount; but, if the information that has come to my knowledge goes for anything at all, those who were induced to purchase at higher quotations should consider the desirability of averaging, for, notwithstanding whatever may be said to the contrary, it is extremely unlikely that the operations about to be commenced will not result in further discoveries." I also drew attention to the statement made by Col. Bulkley in his report upon the Eberhardt Mine—"that both Eberhardt and North Aurora contain rich deposits among the lower and more evenly distributed ores," and pointed out that the value of this statement to the shareholders in South Aurora is that this property is situated between the Eberhardt and North Aurora. These remarks appeared six weeks since, and it now affords me pleasure to congratulate the shareholders upon the fact that the vendors have agreed to give to the company the Chloride Flats Mine, which is said to have produced some of the richest horn silver from any mine on Treasure Hill, and where an important discovery is just reported. From the ore in "dump" large returns of silver will be immediately made. In addition to this valuable concession on the part of the vendors, they have further agreed to pay down 40,000*l.*, making, with the amount previously given, 50,000*l.* This will place the company in a sound financial position, and provide a working capital for the development of South Aurora proper, where, from what is above stated, there is every reason to believe large discoveries of silver will be made.

Just a word personal to myself. A well-known adage has it—"Self-praise is no recommendation," but this is distanced by the injunction that we are not to "hide our light under a bushel;" therefore, in justice to myself, I am bound to make the fact known that each of the mines especially noticed in this series of letters has borne out my anticipations, either as regards advance in negociable or commercial value. I need only say that it will continue to be my most urgent desire to put forth only such information that I have the best possible grounds for believing to be perfectly reliable, trusting the result will prove satisfactory to all concerned.

FREDK. WM. MANSELL.

1, *Pinner's-court, Old Broad-street, E.C., Jan. 24.*

## VIRTUOUS LADY MINING COMPANY.

SIR,—I attended the last meeting of the Virtuous Lady shareholders, who, to my surprise, I find number about 160, and have, I believe, been represented at every meeting by under one dozen. I made notes of the principal points of interest, but did not preserve them, thinking that we should have a report in the Journal, but as it has not appeared I shall be obliged if you will allow me to report from memory a few important points, and if I err concerning them I hope I may be corrected.

Sufficient shares were subscribed to pay all the mine's debts, and to leave a balance of 2000*l.* in hand. There is to be a meeting of shareholders every three months, the next meeting to take place in March. The captain of the mine, who evidently had the confidence and respect of the shareholders present, attended. I understood him that, in his opinion, the mine ought to have a further trial; that three months would be sufficient for that trial, and that if he did not meet with success by the end of that time he would advise abandoning the mine: that he believed the sums he could realise by the sales of ore, supplemented by about 100*l.* per month, would be sufficient to work the mine, and he could thus keep the mine going, supposing no improvement, for about two years. A hope was expressed that no more of a certain kind of writing should have any chance of doing harm to the interests of the shareholders. If credit might be given to the writer for honesty of motive he had certainly been most strangely misled by enthusiasm. The results of the meeting may be a subject of congratulation for the shareholders, especially the point of quarterly meetings. Shares that cost so many persons 2*l.* or 3*l.* each were a few weeks since worth nothing; they are now in demand at 4*s* or 5*s*. G. TABOR.

*Horsmonden, Jan. 23.*

## MINING IN CARDIGANSHIRE.

SIR,—I have this last week paid a visit to some of the young mines in this county, and am happy to find them all in a fair way of shortly becoming profitable. Plynlimmon, at this season of the year, when frost again covers the mountains and prevents the usual operations in the different valleys, is blessed in having made preparations in the way of steam for all weathers, either frost or long droughts, and as this mine never looked better we may now fairly expect its regular monthly sales, and I hope for many years to come regularly increasing. At South Plynlimmon, next neighbour to the above, the sinking of the engine-shaft is being pushed on with all speed; this shaft is now down from surface nearly 40 fms., a good depth to try their levels east and west. Surely with such appearances of by-and-bye becoming a good mine as the lode is even on surface, I must say if this fails I shall have been greatly deceived—knowing the character of the strata and bearings of the lodes of the county for the last 30 years as a miner and mining engineer. Esgair Lle comes next in rotation by following the road, and as a full and accurate report of the manager, Capt. Williams, appeared in the Journal of Jan. 13, I need only add that everything here is being pushed on as well as can be expected. There is an improvement in the mine, and seeing 20 tons of lead carried down to town, and busy as they are in getting around another month's sampling, it speaks for itself that they are looking better than for a long time past. I hope they may have a good mine there; it is the first and last in the county. We next come to West Esgair Lle, within sight and just to the south-west of Esgair Lle Mine, and about one mile distant. Here they have erected a large water-wheel (which works almost with a breeze, for the water appears to be nothing), the wheel being of a beautiful build, and of sufficient power to sink their present engine, or Hamilton's, shaft to a very great depth, also a strong yet simply built drawing machine—in fact, the place, once bare, and almost like a wilderness, now teems with buildings and machinery, with heaps of mineral, &c. The shaft is down about 4 fms. under the adit, close upon 20 fms. from surface; the lode is a remarkably strong one, neither side of which has as yet been seen, although the shaft is very sparey in being sunk, yet the appearance of the lode will show anyone connected with mining that the men are doing their best, the ground being very wet and full of potholes. Just as this lode is to be found, even from Llwarygiyn, in Montgomeryshire, down to the Rheidol Valley of Cardiganshire, until at last lost in the ocean, some beautiful stuff is to be seen on surface, copper and lead mixed together, which has a fine appearance, especially upon such a rainy day as I had on Wednesday last. I have no hesitation in saying that a more promising lode cannot be found.

In proceeding on our journey towards the west, we pass some mines of minor magnitude, such as a new beginning of the old Bryn Glas, with a few men as yet; also the Glan Castel Mine (known at one time as Eliza's Corner). Here they have discovered a beautiful branch of lead near the surface on the bank, and have gone down by the River Castel side, and at the present time are bringing up a dead level on the course of the lode, although they might not have expected to have met with much lead until coming up within a short distance of the lead near the surface, yet they are at this time breaking saving work; being a caunter lode, it dips to the north of west, consequently running right into and commingling with the mine adjoining—

The Cardiganshire Bog Mine, upon which I would say a little, having known the district for many years. This mine adjoins—in fact, is in between—some of the best of Cardiganshire mines. To the north may be found the Old Cwmsymlog Mine, known for ages; also Bwlch Consols, Cwm Erfin, Cwm Sebon, and further north-west, west, south-west, and south, Goginan, of old renown in Cardiganshire mining. Cefn Cwm Brwyno, of which mine Capt. Paull's report of Jan. 6 will show more clearly than I can upon my present journey its present and future prospects; and then more immediately adjoining the Cardigan Bay is the Powell, Llywernog, Clara, and the Nanteos Consolidated Mines, of which more hereafter; and then eastward, by the several little takes now held by a few friends, as far away as to the Esgair and West Esgair Lle Mines, and Plynlimmon rich district. By looking over the map or plan of the mine, the lodes therein may be traced for the whole length of the very extensive sett, several of which I have often seen. So many reports, from so many competent gentlemen, appear in the prospectus, published in last week's *Mining Journal*, that any detailed remarks from me would be considered almost superfluous. I would, therefore, merely refer the would-be shareholder to one report in particular, that of Mr. James Lester, who has for some time managed the property for the present and last party. Mr. Lamers. Although years have rolled away since the old mine was worked, yet up to now little has been done but on the surface, except a shaft that was sunk some two years ago upon a south lode, from which some beautiful specimens of lead may be seen at this present time on its banks. I may, however, suggest that a cross-cut be driven through the hill, commencing on the south side near the Llywernog boundary, which would in time intersect all the lodes as yet discovered on the property, and which cross-cut would come into the old Bog Mine, very advantageous to the carrying away of the water and of bringing all the stuff to be dressed as near the turnpike-road as possible, which at this point is about eleven miles to the shipping port and railway station of Aberystwith. The new company cannot fail to succeed, as, looking over the prospectus and accompanying plans, knowing the district and its advantages, I can only repeat that it must ere long turn up a trump and a safe investment, being only 40 fms. deep.

To the south of this mine about one mile is the long range of mines known now as the Aberystwith Silver-Lead Mines, meaning the Bwich Gwyn and Penrhiw United: here is another of the old class of mines, 40 fms. deep, and abandoned. What the opinion of the mining generation of the last 30 or 40 years were I know not; but, strange as it may appear, all the mines that at this time are doing well in this county were at one time or other knocked through poverty, at about 40 fms. deep. By being taken up, and again a little sinking, driving, and cross-cutting, has brought the Cardiganshire mines to what they now are and have been for the last 20 years, and may be for generations to come.

SAMPSON TREVETHAN, Mining and Consulting Engineer, &c.

*Penllwyn, Aberystwith, Jan. 22.*

## OLD LLANGYNOG, AND WEST LLANGYNOG MINES.

SIR,—Permit me, if you please, to say a word on "X. Y. Z.'s" attack. When an antagonist so forgets his subject as to use personalities in its defence, he becomes an unworthy opponent, and it is high time to turn away from such a one. "Observer" challenges "X. Y. Z.," or his clique, to prove a single personality on his part. He opened a legitimate discussion on a mining prospectus and scheme, and replied to "Miner's" defence, letting him and his company down mildly that time. "X. Y. Z." has aimed a misdirected blow. "Observer" wants neither champion nor scribe on his behalf, and, further, he knows of none who can supply or dictate to him in the science of practical mining and reporting. But it appears evident that this company requires both of these to help out their prospectus and scheme. "Observer," in his previous letter, endeavoured to show that the prospectus issued was misleading and untrue. This is a material point. Let the public judge; and "Miner" has acknowledged a flaw in it. Yes, but there are yet more in the whole scheme, and as the discussion proceeds he will show it. But in this place "Observer" must direct the mining public to enquire very carefully and satisfy themselves as to who the parties are, and how they stand in the mining world; perhaps they may find some of them who know more about retail trades than they do of scientific mining engineering. "Observer" has satisfied himself upon the point, and he would further advise his clients to wait awhile in reference to subscription to the share list, as "Observer" is prepared to take up the subject of this prospectus and scheme in a legitimate discussion.—*Llanfyllin,* OBSERVER.

## OLD LLANGYNOG AND WEST LLANGYNOG MINES.

SIR,—I have carefully watched the discussion in your valuable Journal, for some time past, with respect to the above mines, and to my surprise have read a letter signed "X. Y. Z.," evidently bent on abusing "Observer's" character, and not mentioning a word about the misstatements made by several parties connected with the latter mine.

Now, Mr. Editor, I beg to say that from my childhood I have known Llangynog and Pennant, and as to the boundaries of Graig-las (West Llangynog), and the old Llangynog Mines, they are distant from each other upwards of a mile (1760 yards).

There are four farms lying between the two mines—to wit, Pengwern, the property of Messrs Roberts and Richards; Llwynonu, the property of Miss Davies; Cwmdwygo, the property of Mr. H. D. Griffith; Caerhun and Tyn-y-coed, the property of Robert Owen; then comes the farm Graig-las (West Llangynog) the property of Capt. Thomas, manager of the mine, who is both owner and occupier thereof. If any person who resides near this place will attempt to refute any of these statements, then let him say the sun never shone.

Now, Mr. Editor, for misstatements. What has become of the 200 yards or 250 fathoms between the boundaries of the two mines? I for one would advise the mining community to scrutinise these matters before rushing headlong into an investment grounded merely upon the statements of interested parties.

*Llangynog.* A. B. C.

## REDMOOR MINE, CALLINGTON.

SIR,—We have another remarkable example of patience and perseverance being ultimately crowned with success by legitimate mining in the above old mine. Some years ago it paid good dividends, derived from working a lead lode. Through the abandonment of a neighbouring mine the workings were filled with water, and consequently Redmoor ceased working on the lead lode, and commenced operations on another portion of the sett upon a tin lode. The past few years have been very trying to the adventurers, the result being a reduction of the shares through relinquishment and forfeiture from 12,000 to 3000. So gloomy was the prospect that another month would have brought it to a stand, but for the timely discovery of a lode several feet wide, and highly productive for tin, which will leave a good profit to the adventurers. Capt. Gifford, agent at the Prince of Wales Mine, has recently been appointed agent at Redmoor; and if I am rightly informed the mine is under the same management as the Grenville Mines, who are about to prosecute the mine with that energy it deserves, so that in a few days we may expect a great improvement in the price of the shares, with the prospect of early dividends to reward those who have stuck to the mine so perseveringly. INFORMER.

## WEST CHIVERTON MINE, AND ITS MANAGEMENT.

SIR,—I noticed in last week's Journal a letter on the above subject, but the writer is evidently unaware that it is the rule for three months' bills to be given by the merchants purchasing lead ores, and that the balance, 650*l.*, referred to is not cash, but acceptances lodged with the company's bankers and not at maturity; and, whilst the amount of assets over liabilities shown at the last meeting was 8800*l.*, there was then an overdrawn cash account at the bank. On this ground, I understand, it was urged by one or two shareholders present that no dividend could be declared. Now, I take it that the standing and position of the merchants who have accepted these bills cannot be questioned, and that there would be no difficulty, with the present state of the money market, in discounting them at or under 4 per cent.; and, I ask, would not the majority of the shareholders prefer, even if bills for 5000*l.* had to be discounted for the full time, at say a cost of 50*l.*, or just 4*d.* per share, a decreased credit balance to this extent, and receive a legitimate dividend according to profit made on the quarter? Naturally, some of the proprietors may find it necessary from time to time to dispose of their shares, and it appears to me unreasonable that others should reap the profits made during the time they were holders. There is no doubt but that the shares are now quoted at a price far below their real value; but, judging from the reports of disinterested agents, this can only be temporary. I would strongly recommend the meetings should be held where most convenient to the majority of the shareholders, enabling them to obtain any information they required from the purser and manager. Even Li-keard would be more desirable than so far west. A SHAREHOLDER.

## GREAT NORTH LAXEY MINING COMPANY.

SIR,—Allow me to ask, through your columns, what has become of the reports of the agent of the Great North Laxey? In vain have I looked for them for the last three weeks, and as a point of considerable importance was to come off (I mean in the 38 or 36 cross-cut) very shortly, according to the last report, a month since, I, in common with other shareholders, feel the disappointment the more. Redress cannot, I am sorry to say, be obtained from the Secretary. This I have learned by experience. Any complaint in that quarter is met with a curt reply. When last I enquired I was told all the reports received were inserted in the Journal. Is this true? Will the secretary now say that no report has been received since Dec. 30? I hope the shareholders will attend the next general meeting, and insist upon a fortnightly report at least. Great things were expected when Mr. Peter Watson joined the direction, and for two or three weeks some life did appear to have been infused into the concern, but it soon died out. I know many shareholders are greatly dissatisfied, and justly so. My advice is—Attend the meeting, and insist upon certain questions which are intended to be put to the secretary being answered satisfactorily. Look what a change of captains has done for Van Consols, and even Taquarli has shown signs of recovery since it changed its captain. If Mr. Rowe's positive expectations have not been realised, why not say so? If the lode has not been found, or cut poor, why not tell us? I have a considerable stake in the mine, and many of my friends have so also, and we are naturally anxious to know the true state of affairs. When one receives private communications from dealers offering shares below the quoted prices one naturally suspects all is not right.

A SHAREHOLDER.

## WHEAL RUBY.

SIR,—It is gratifying to the miners of this district to find that a respectable company has been formed in London for working the above mine, and that active operations are to commence forthwith. The high esteem this property is held in can be best ascertained by consulting the most experienced mining men in the neighbourhood, for which purpose, and an inspection of the sett, I understand one of the directors visited the property last week, and the result of his investigation I doubt not must be highly satisfactory to him and the company.

The sett is one of the most extensive in the locality, and lies between groups of mines both on the north and south which have and are still yielding immense riches. This ground has a situation equal to the best mines in the county, and I have seen lodes which have lately been explored here, and presents the most encouraging prospects. The main lode, which traverses the entire length of the sett, is a champion, which I have seen at several points, with some rich tin that has been raised from it. This lode has attracted the attention of miners here for a great number of years, and many have expressed their desire to work on it, and had applied for a grant to work it on their own account, which, however, could only be obtained for the formation and development of a company, otherwise, in my opinion, an important mine would have been opened up here long ago by the efforts of poor men alone. It may not be generally known that about 65 years since at attempt was made to work this main lode by some local men of very limited means, in Penzance. They drove an adit on it for about 100 feet in length from the eastern boundary, and large quantities of tin were raised in doing so, although the deepest point of operation could not have been more than 14 fms. below surface, and beyond the old works is where all practical men look for the most productive mine.

It seems the old workers, for want of means for sinking suitable shafts and continuing the adit further west to reach the junction of lodes, and the then low price of mineral, had to abandon it, but not without expressing their belief that some day it would be found a great tin mining property. Since that time 300*l.* worth of tin has been sold from the back of this adit in working it three weeks only, and by one pare of men, which is a proof of the quality of the lode to the extent of operations. The name of the mine at that time was "Tincroft;" such names were formerly given according to the nature of mineral discovered and place found. The present Tincroft at Camborne, which is now yielding 100*l.* per week profit, I suppose, necessitated the alteration of name here to Wheal Ruby, which is not a bad name, I must confess, and I hope, as I and all miners here fully believe, it will prove, according to the intent and meaning of its former name, a clue of tin; and, although it will not be known now as Tincroft, this cannot alter the value of the undertaking. It has, in a miner's point of view, the quality and situation for becoming a great success on a very moderate outlay, and equal in value to the great Tincroft of the present day.—*Ludgvan.* A MINER.

[For remainder of Original Correspondence see to-day's Journal.]

## BRITISH ENTERPRISE IN SPAIN.

It is a rather curious circumstance that with one exception—that of a company formed but a few months since, and which has consequently not yet had time to develope the property it has purchased—the whole of the Spanish silver-lead mines wrought by British capitalists, and quoted in the *Mining Journal*, occupy positions in the list of dividend-paying mines; capitalists will, therefore, be naturally inclined to give attention to another company of the same class, the prospectus of which will be found in another column. The pertenencias at Berlanga, which the ANGLO-SPANISH SILVER-LEAD COMPANY proposes to work, are described as being in a virgin district, without a single company existing, which places it in an exceptional position. Labour can be had in abundance, at about 2s. 6d. per day for miners, and 1s. 6d. to 2s. for general labour. The property, which is situated in the province of Badajoz, and district of Estramadura, is about 1½ day's journey from Seville at present, but the railway connecting Seville with Merida, now being pushed on with vigour, will when completed be within seven miles of the mines, and comprises the Santa Catalina Mine, a large pertenencia denounced under the old law, and therefore about 300 metres on the run of the lode, and 200 metres wide, about a mile from which is the Pastora group of mines, comprising 57 pertenencias, each of 100 metres square, giving an aggregate superficial area of about 141 acres. In addition to these a new sett of 24 pertenencias, called Tronador, has also been applied for, and will be included in the purchase.

The property has been carefully inspected and favourably reported upon by Capt. J. H. Rodda, of Calstock; Mr. Charles Remfrey, M.E., of Linares; Mr. Etchats, engineer of the Gonessa Mines, Sardinia; and Don Antonio Falces, Spanish Government engineer, of the Sierra Almagrera, great importance attaching to the report of the last-named engineer, because he was directly commissioned by Messrs. C. de Murrieta and Co., of London, to inspect the property and also to examine and verify the titles. In consequence of his report Messrs. Murrieta have since undertaken the consignee agency and foreign banking business of the company. Mr. Falces states that the land where the mines are situated is not very hilly; there are some small hills, and the quality of the land is uniform. The quality of the rocks where the veins of ore commence is excellent, though there is plenty of lime (calcareous land), sulphate of barytes, quartz, oxide of iron, spar, and carbonate of lime. The vein consists entirely of sulphuret of lead, or galena, very pure, and with small admixtures of gangue, which in some places exists in very small quantities, as demonstrated by the assays, to which we will refer again further on. These mines have been worked in bygone years, which is proved by the traces of old works still to be seen, but they all indicate that the mining operations were not then carried on scientifically, nor with sufficient apparatus or machinery for working the mines properly on a large scale.

The vein in question can be traced in a direct line from east to west for more than 2400 metres, descending to the depths to which the works have reached with a declination of 10° to 13° to the south, and the roof or upper part towards the north, with the same declination towards the east. The minimum extent of the vein varies from ½ to ¾ metre to 3 metres, or rather more in some places—for instance, in the San Juan Mine. The continuity and fabulous power of the vein, he continues, and the pureness of the ores, are very noteworthy circumstances in estimating the genuine importance of the mines, the value of which will be very much increased if the shafts already sunk be made deeper. Mr. Falces considered one general assay sufficient, as all the mines have the same recognised vein of ore, the difference in the names of the mines being unimportant, and arising from accident or caprice on the part of the concessionaires. The assay of Don Fernando Molnenhaner, mining chemist, of Garrucha, shows the ore to contain from 69 to 85¼ per cent. of lead and from 0·50 to 1·10 ozs. of silver per quintal (say, from 1½ oz. to 30 ozs. of silver per ton of lead, which is the more usual estimation in England). There is another vein in a southern direction, at a distance of some 90 metres from the vein already recognised, and he considers it desirable to secure the mining rights for the land to the south and the north, because they also include the districts where the principal vein of ore branches off. The report of Mr. Falces is altogether of a very favourable character, and those of Mr. Remfry, Capt. Rodda, and Mr. A. Etchats, are equally encouraging, whilst the prosecution of the works in a manner to secure the best attainable results for the shareholders is assured by Mr. Cuthbert Burnup, the original concessionaire of the property, having undertaken the general management in Spain, with the co-operation of Mr. Remfry, whose extensive experience in the important mining district of Linares is well known.

It appears, then, that abundant as are the known localities in Spain in which argentiferous lead is discovered in paying quantities, yet one more is to be added to the list, if we may trust the reports on which the Anglo-Spanish Silver-Lead Company appeals for support. The westernmost spurs of the Sierra Morena, running between the provinces of Badajos and Huelva, are celebrated for the great deposits of pyrites and of manganese which they contain; but the nearer portion of the same range, due north of Seville, appears destined to display lead works of remarkable persistence, and perhaps of equal richness. It is most unlikely that Government surveyors from other provinces, English miners accustomed to Spain, and sundry other competent witnesses, whose testimony is given *in extenso* in full reports by the company, can be mistaken in drawing attention to this new locality. The company appears to have secured the results of careful explorations and workings. As our manufacturers want all the metal that the miner can bring, it is matter of congratulation that the increasing demands of the world are being provided for by the discovery of additional sources of mineral supply.

## CHILIAN COPPER MINING ENTERPRISE.

The particulars of the sale by auction, on Jan. 9, of the Chilian estates of the late Mr. Sampson Waters, of Gyllyngdune, Falmouth, given in last week's Journal, were, we are informed, inaccurate. The sale was in pursuance of an order of the Court of Chancery, and was conducted by Mr. Robert C. Driver (of Messrs. Driver, of Whitehall), who explained the advantages which the property possessed for profitable working, and then offered it in one lot. As there was a very general opinion that the development of the property was likely to prove remunerative to those undertaking it, there was a very brisk competition until the bid reached 97,000*l.*, when no further advance being obtainable the auctioneer announced that in consequence of the considerable advance in copper which had recently taken place the reserve had been fixed much above that amount; he, therefore, refused the offer, and declared the property, as one lot, bought in. Failing to sell the entire property in one lot, Mr. Driver proceeded to offer it fractionally, in accordance with the advertisement which has frequently been published in the *Mining Journal*.

The first lot put up was two-thirds of the celebrated Descubridora Mine, and the opinions entertained of the property may be judged of from the circumstance that there was an animated competition for it up to 78,000*l.*, which, although a large amount, was certainly less than its value, considering that the offer, taking the present price of copper, was below four years' purchase. As the reserve price fixed by the Court was more than the 78,000*l.*, the lot was, therefore, not sold. The Descubridora Mine has been working since 1859, and it has yielded large profits from that date, and continues to do so. It is now down to the 94 fm. level, and has been rich from the surface. The ore is lengthening, the average width of the vein being 30 to 80 ft., composed of yellow sulphurets. The burrows, by applying steam-crushers, will yield large returns. Within the last few months two new steam-engines have been erected, at a cost of 6000*l.*, and are now at work: these will increase the returns. The engines are one of 20-horse power for drawing, and one of 8-horse power for crusher. The mine is in thorough working order, and well stocked with materials, rails, jiggers, crushers, &c. In connection with this mine, the adjoining setts of San Juan, Canchas, and San Francisco were acquired for the purpose of securing the ground in all directions round the Descubridora Mine, and they have since been worked on a limited scale. The Canchas is making a small profit. San Juan and San Francisco are being worked at a trifling loss.

The second lot offered was the San Pedro Mine, situated about 60 miles from the port of Chanaral, which has given immense riches, but owing to a run a new shaft had to be sunk 122 fathoms from the surface, and is now communicated with the lode at this depth. The lode is composed of black and yellow sulphurets, of a produce of 50 per cent. for copper. The burrows are large, and will pay for working over, having water sufficient in the mine to do so; for it should be mentioned that a good well of pure water is near to and belongs to the mine. The bidding for this lot was likewise animated until Mr. F. R. Wilson, of the Stock Exchange, bid 16,000*l.*, at which price it was knocked down to him.

The two succeeding lots, representing about 12,000*l.* worth of property, were not sold; and the fifth, a small lot, was sold, to the person who purchased the San Pedro Mine, for 350*l.* We have much pleasure in making these corrections, and thus removing the impression that the whole of Mr. Waters's Chilian property was sold for the amount mentioned. Lots 2 and 5, which were the only two lots sold, really formed but a small portion of the property which has been advertised, all the more valuable parts still remaining under the control of the Court of Chancery.

## VARIABLE EXPANSION GEAR FOR WINDING-ENGINES.

It was announced in the *Mining Journal* a few weeks since that Mr. CHARLES BALL (of Messrs. Charles Ball and Co., New Bridge-street, whose names are well known in connection with the Burleigh rock drill) would be prepared to accompany English engineers interested in the economic working of mines and collieries to the celebrated mines of the Blanzy Company, near St. Etienne, Saone et Loire, in order to afford them an opportunity of examining an improved system of variable expansion gear invented by Mr. AUDEMAR, the chief engineer of the company; and we are now enabled to publish a description of the invention. The primary object of Mr. Audemar's efforts was to increase the power at his disposal without necessitating the erection of additional boilers, and he succeeded not only in doing this, but also in greatly diminishing the consumption of fuel, and even dispensing with part of the boilers already in use. Various forms of fixed cut-offs had previously been tried and abandoned as unsatisfactory. In finding an efficient substitute for fixed cut-offs Mr. Audemar carefully kept in view that the conditions which his experience had proved to be necessary were—to work the machine with the expansion gear, and to be enabled to suppress the action of the cut-off instantaneously, when desired; to render unnecessary the attention of the engineer, who has already enough to attend to; not to increase the number of levers he will have to work, nor the power necessary to work them; and to make the cut-off variable, so as to adapt itself to the variations of resistance of the load to be raised—and these conditions his improved gear appears well calculated to satisfy.

The improved apparatus consists of a double cam, one-half of which serves for the forward stroke and the other half for the back stroke. Each portion of this cam has varied profiles, so as to give the various degrees of expansion, from the smallest to the greatest; and it is so disposed that the middle becomes the neutral point, like that of the Stephenson slide, and corresponds, like it, to no admission, while the two extreme points give full open. A valve on the Cornish system, placed before the ordinary distribution of the machine, is used to produce the expansion of the steam. This valve is put in motion by a cam, the rotation of which is caused by the gearing on the shaft of the engine, and it opens and closes according as one or other part of the cam is for the time being in operation. If the Stephenson slide be at its neutral point, the cam would be in a similar position, and the two, being set in motion by the same lever, will at the same time occupy the extremes of their course, If, then, the engineer inclines his reversing lever, the several profiles of the cam being presented to the valve, produce a corresponding cut-off, which will become absolutely none if the lever be pushed full home. Thus the mere inclination of the lever which the engineer already uses suffices to produce the desired effect both for the forward and backward movement. The apparatus in question has given the most satisfactory results, and has been found to work most satisfactorily in connection with the machines to which it has been applied, a saving of at least 50 per cent. in the boilers and fuel being claimed for it. It is remarked that engineers, however, scarcely require figures since the effect of working steam expansively has been ascertained in the working of engines employed for other industrial purposes, and that Mr. Audemar's invention fulfils all the conditions necessary for the satisfactory working of the winding-engines. It can be made to work with or without the stop at any instant, and can thus start and stop with facility at any portion of the stroke; the variable cut-off can be applied at pleasure, and may be regulated by the resistance to be overcome; it is unnecessary for the engine-tenter, whose attention is already fully occupied, to pay any attention whatever to the new apparatus, and as the number of levers he has to attend to is not increased, no additional physical effort is required. It will be seen that the stop is formed of a double-seated valve, placed a little in front of the ordinary port of the machine, this valve being controlled by a double cam regulating the movement of the Stephenson slide. The two extremities of this cam are so arranged as to keep the valve fully open, and the other parts act upon the stop for the fore and back stroke. The operation of the apparatus is this—The engine-tenter has still nothing to attend to but the reversing lever; when this is inclined toward the end of the stroke, the engine is freed from the stop; this must be done each time the engine is started. The lever is then replaced in its usual position, and the engine acts expansively and economically during the remainder of the working.

An essential feature of the invention is claimed to be that the objections to the Stephenson slide when not at the extremities of its course are avoided. The connection of the slide with the cam is, in fact, made by intermediate sectors, so that the speed of the two parts is widely different. Thus the slide always occupies the end of its course, and gives the maximum opening to the ports, although the cam is sufficiently advanced to produce considerable expansion. The system, which appears to be free from complications, and which has been practically applied, has enabled the Blanzy Company to dispense with the purchase of boilers, which had become indispensable, and to secure in addition a saving of fuel equal in some cases to 40 per cent. And they were enabled in one case of four boilers already over-worked to put one out, for the purpose of cleaning. These results are so remarkable that the general adoption of the invention is confidently anticipated; and, as all the parts are ready made, the stoppage for a single day is sufficient to apply the arrangements to existing engines; and they, moreover, meet the approval of the workmen, because they do not at all interfere with their existing habits.

## IMPROVED DOUBLE CONDENSER.

An ingenious arrangement of double condenser, by the adoption of which the use of an air-pump in the condensation of steam is entirely dispensed with, has been invented and introduced by Mr. John W. McCarter, of the City Saw Mills, Londonderry; and from the excellent results obtained with it there is little doubt it will be extensively employed, especially as no head of water is required to work it, as is the case with the ordinary blow through condenser. The result of six months trial has quite satisfied the inventor of the great economy or the arrangement, and he is equally convinced of its applicability both to land and marine engines.

The improved condenser consists of an upright cylindrical chamber, divided into two compartments, of which the upper is the much larger. The exhaust steam-pipe from the engine is connected with the top of the upper compartment, and at the bottom of this compartment there is an aperture, with a valve opening into the lower compartment, which has likewise an aperture at the bottom, provided with a valve opening into the waste water tank. The injection water is admitted near the top of the upper compartment, and at the top of the condenser is a valve for allowing the escape of air in blowing through previous to starting. The valves at the bottom of each compartment are metal discs, faced with india-rubber, and kept in place by counterbalance weights, acting on levers keyed to shafts passing through stuffing-boxes in the side of the condenser. Before starting the engine it is necessary to blow the air out of the upper vessel by passing steam through the engine, in the usual way. The engine being started the condensation goes on in the ordinary manner, the injection water being brought from the river or tank by the vaccum formed in the upper compartment of the condenser. The vacuum is got up at first by a jet into it from a small cistern overhead, and which is turned off after starting.

When the engine has made a certain number of strokes a small quantity of water is admitted to the lower vessel through the steam-valve, this steam displacing any air that may be left in that compartment. The water-valve being then opened a small jet of water is thrown into the compartments, this condensing the steam used for displacing the air, and thereby forming a vacuum, as in the upper vessel. Upon this the upper condenser valve opens, and allows the products of condensation to fall into the lower compartment. By the revolution of a tappet shaft the air-valve is then opened, destroying the vacuum in the lower vessel, and the atmospheric pressure on the underside of the lower valve being thus counterbalanced the water opens that valve by its weight, and passes into the waste-pipe. The valve then closes again, by the action of its spring, or weights and lever, and the operation we have described is repeated continuously. The pipe conducting steam from the boiler to the lower condenser for displacing the air, and forming a vacuum, is furnished with a reducing valve, by which the pressure is reduced to 1 or 2 lbs. above the atmosphere, this being found sufficient pressure for the purpose, and making the quantity of steam used very small, as the lower vessel only requires to be blown out at every 10 or 15 strokes of the engine. This is regulated by the operation of the tappet-gear. The invention altogether appears well worthy the attention of the mining interest.

## BLASTING BY ELECTRICITY.

The constant recurrence of accidents in blasting, both in metalliferous mines and quarries, notwithstanding the now almost universal employment of the safety-fuse, has caused the opinion to become very general that nothing less than the ignition of the charge by electricity can be relied upon to enable the workmen, before the explosion takes place, to get far enough from the charge to secure them against danger. As a consequence, the number of electric exploders which have from time to time been submitted to the notice of mine managers has been considerable, but sometimes from the little reliance to be placed upon them, sometimes from their extreme delicacy of construction making them very liable to derangement, and sometimes from their costliness, they have never been brought largely into use. In all industrial mining operations (in military mining the case is different) it is essential that each pare of men should be provided with a separate exploder, for the pares are frequently working so far from each other that to think of fetching the exploder each time a shot has to be fired would be quite out of the question. The instrument, moreover, must be not only cheap but capable of standing plenty of rough usage, for our miners are so accustomed to hard and useful work that they have an absolute objection to any implement intended for their use which has even the appearance of being delicate.

Well understanding the character of apparatus required, Mr. E. WELCH, of Eden-street, Hampstead-road, has recently patented (through Messrs. Vaughan and Son, of Chancery-lane) an apparatus for generating a current of electricity which is capable of being applied to discharging fuses for mining, military operations, and other purposes. The apparatus consists of a brass or other metallic frame carrying a permanent magnet, to the ends of which magnet are attached soft iron cores, upon which coils of insulated wire are placed. An armature of soft iron is placed against the ends of the soft iron cores, and through the centre of the armature, and at right angles thereto, is fixed a spindle of circular section, which is carried through suitable bearings. On this spindle is fixed a collar, and on that part of the spindle which is on the side of the collar furthest from the armature a metallic weight or ram is placed capable of sliding freely thereon. Behind the weight or ram, and between it and one of the bearings carrying the spindle, is a spiral steel spring, just fitting when fully open and at rest between the weight or ram and the bearing, when the weight or ram is close up to the collar on the spindle. Beneath the spindle, and at right angles thereto, is placed a metal spindle carrying a ratchet-catch, which takes into a suitable groove in the weight or ram, such spindle being free to revolve through a portion of a circle. When the last-mentioned spindle is turned, which operation is effected by means of a key adapted for the purpose, as will be well understood, it draws back the weight or ram, and compresses the spring between it and the bearing. When the spring is fully compressed the catch slips out of the groove, and the weight or ram being impelled by the action of the spring strikes against the shoulder and removes the armature from the magnetic cores, thus inducing a powerful current in the coils. A small lever urged by a spring is so placed as to lift a bolt at the back of the spindle, which carries the armature, and prevents its return until (the key being released) the spindle carrying the catch is returned to its former position by a spring attached to it for that purpose, and in so returning it lifts by means of a small projecting pin the lever carrying the bolt, when a fine return spring provided for that purpose sends the armature back to its place on the magnetic cores, ready for another discharge.

It is necessary to cause the circuit between the coils and the wires which lead to the fuse to be broken exactly when the armature is at a certain distance from the magnet. This is effected by placing an insulated stop just above and beyond the armature. In the top of the armature is screwed a steel pin which projects upwards and at right angles to the magnetic cores, and which moves with the armature. A small lever is fixed to an adjustable frame, which frame has a slot for the pin to pass along, and at the side of the slot the lever is centred and so arranged with a spring that it shall press against the insulated stop. The lever is so formed that sliding the adjustable frame backwards or forwards, nearer to or further from the armature pin does not cause the lever to turn on the centre, the inside face of the lever being parallel to the slot at that end where the lever presses on the stop, but nearer the centre it slightly inclines across the slot, and has a sudden inclination near its centre. When the armature is at the proper distance from the magnetic cores the pin just touches the more suddenly inclined part of the lever, and removes its end from the stop, thus cutting off the connection, and as the pin slides along it only passes smoothly along the lever, as that part which previously just inclined across the slot is now parallel to it, so that the lever is not pushed further away than is requisite suddenly to break circuit, and so the spring is not strained, and the pin is not impeded in its further motion. By connecting the wires in a suitable manner, as will be well-understood, this arrangement may be made either to break the full circuit, or to simply cut off "short circuit," as may be required.

As the whole apparatus is enclosed in a small box it is obvious that it can readily be placed beyond the reach of injury from rough usage, whilst the facility offered for securing the box by lock and key will effectually prevent the mechanism being tampered with. The key for operating the spindle carrying the ratchet catch is passed through an aperture in the box provided for that purpose, and the necessary connections are made with ordinary studs outside the box for attaching the conducting wires. The main feature of novelty appears to be the mode of removing the armature from the soft cores, but the whole arrangement is very ingenious and compact, and appears well calculated to meet the requirements of miners. It is understood that several colliery owners in South Wales to whom the invention has been submitted have expressed their approval of it, and those interested have great confidence in its very general adoption as soon as its existence becomes known.

THE DIAMANTINE COUNTRY.—The late lamented ex-President of the Royal Geographical Society is universally quoted as a scientific conqueror for having predicted by deduction the gold discoveries in Australia. Sir Roderick I. Murchison had visited the Ural Range; he presently saw rocks from the fifth quarter of the globe; he found them identical, and he prophesied accordingly. I visited the Itacolumite regions of Minas Geraes and the Diamantine Country in early July, 1867. Until then it had been the general belief that diamonds were confined to a zone bounded by latitude (north or south) 18°—9°, the sole recognised exceptions being the equatorial diggings of Borneo and Malacca. The aspect of Minas Geraes at once assured me that the precious stone, so far from being limited to that area, would be found scattered over many parts of the world, and, in writing the Highlands of the Brazil (vol. 2, vi., p. 80), I had hoped to announce the theory to a practical public. Unfortunately my absence in Paraguay and other parts of South America delayed the printing of the book, and Messrs. Tinsley were unable to bring it out before December 17, 1868. Meanwhile the diamond had been discovered at some fifteen places in California, in Australia, and north of the Cape, and announced by the *Melbourne Argus* and the *Colesburg Advertiser*. Pretending to little more of science than what is known to the majority of educated Englishmen, I have therefore, if the analogy be correct, performed a great feat of induction without ever being aware of its being a feat, or without the slightest importance being attached to it by myself or others.—RICHARD F. BURTON, F.R.G.S.: Garswood, Newton-le-Willows.—*Athenæum*.

OBVIATING DEAD CENTRES.—The invention of Mr. E. QUINN, of Brooklyn, U.S., has relation to means for communicating motion to shafts, consisting in the construction and novel arrangement of a double crank. He places arms of the double crank at a distance from each other of 120°. Or the two wrists of the double crank to which the pitman-heads are attached have their position coincident with two of the apices of an equilateral triangle, whose centres coincides with the centre of the shaft. In order to construct one form of his double crank the shaft is bent or shaped so as to form parallel arms. From the upper ends of these arms extend outward and downward in opposite directions other arms lying in a plane perpendicular to the shaft. The outer arms make with the inner angles of 60°. The outer arms turn at their ends, and running parallel with the shaft for a sufficient distance to admit of the connection of the pitman-heads, bend again, and running upward and inward parallel with the said outer arms, join, making an angle of 120° with each other. The connecting rods or pitmen are pivoted to a lever respectively above and below its fulcrum and are connected with wrists. These rods are pivoted at about equal distances from the fulcrum, and they are about the same length.

CONSUMING SMOKE IN STEAM-BOILER FURNACES.—Messrs. BUTTERWORTH and HOWARTH, of Rochdale, fit or build in the fire-bridge an air-channel, preferably formed of cast-iron or of fire clay, through which air flows from the ash pit and mingles with the products of combustion entering the flue beyond the fire-bridge. The said channel is preferably curved or bent in an upward direction, and the entrance thereinto is fitted with a regulating door or damper, and the exit end with a grid, or perforated plate, or the said end is left entirely open.

# Royal School of Mines, Jermyn Street.

[FROM NOTES BY OUR OWN REPORTER]

LECTURE XV.—From what was stated to you in the last lecture you will have seen that the efforts to introduce improvements into the established methods of boring had in view a reduction of expenditure both of time and cost. The putting down of bore-holes, whatever its saving may be as compared with shafts, and whatever its advantages may be as regards the work of exploration, is a matter, after all, which involves great expense and outlay of capital. Time also must be taken into account, as sometimes four or five years have been occupied in boring when exceptional difficulties have arisen. I must mention, too, that the entire abandonment of bore-holes is not an unknown thing from breakages of the rods of a serious character, or by force of circumstance, their swerving from the perpendicular. The latter, indeed, is a difficulty which suggests itself noticably to those not accustomed to borings; but really with the improvements in modern apparatus, and with the free-falling cutter, there is every probability that the verticality of the bore-hole will be secured. Exceptions, however, will occur when one side of a hole happens to be very hard, and the other side is very soft, which makes the borer fall obliquely. I do not say this often happens, but it has occurred several times in portions of cretaceous beds which overlie the coal beds in the North of France. Very few bore-holes, however, have failed in consequence of deviations from the true direction. Generally speaking, any such deviation is soon discovered, and the bore master speedily sets it right. The great expense and loss of time occasioned by screwing and unscrewing, although partially reduced by the erection of lofty towers at the surface, and the further lengthening of the several portions by making a shaft, so that the boring may go on somewhat below the surface, has led, in a great many cases, to the substitution of a rope for boring-rods, and numerous bore-holes have been put down by its means. The Chinese long since have employed the rope, and some astonishment was created almost a century ago by a French missionary in that country coming home and reporting that he had seen hundreds of wells put down in China, by means of ropes made of bamboo fibre, to depths varying from 1000 to 3000 ft. This story about the depth was at first disbelieved, but after investigation the fact was confirmed, and is now thoroughly established. The ropes are passed around cylinders, and the circumference being measured and multiplied by the number of turns the full length of the rope is obtained. This gave a great impetus to rope-boring, especially in France, and the saving of time thereby effected is a great thing, but it is extremely advantageous in another point of view. I have mentioned as the commoner system that the cutter when sufficiently used is removed, and the sludger put down, but there are cases in which the two are combined. The cutting tool being made cylindrical, the detritus passes through it and is carried off by the water, so that the necessity for sending down the clearing tool is very rare. Another plan is to have a cylindrical cutter, with an arrangement to let the stuff go up, and then retaining it with valves. In these cases the tortion of the rope assists in directing the blow each time. The lifting apparatus employed by the Chinese, and, indeed, in this country also, with the rope is simply the spring-pole, which I have already described. It has been objected to ropes that they are more apt to deviate from the perpendicular, and thus lead to the loss of considerable sums of money by the failure of the bore-holes: but, on the other hand, it is alleged that if it should deviate they have apparatus by which the hole can quickly be put right again. It has been shown, also, that in sinking a hole through a mass of chalk, for the purpose of obtaining water, the work has been done by the rope at a very economical rate.

In some rather strong chalky deposits near Rheims, in Champagne, a case of rope-boring occurred, in which a hole was put down at the rate of from 20 ft. to 30 ft. per diem, the cost being no more than 3fr. per foot. They employed a borer, which was also a clearing tool, for the cutting edge was placed upon a cylinder 4 ft. in length, in which the material cut away was collected, and thus drawing up the tool by a windlass, it was emptied and again lowered with rapidity. Messrs. Mather and Platt, of Salford, who have done a good deal of satisfactory boring for water in the New Red Sandstone, and have been successful also in boring through thick masses of rock salt to a depth of from 1200 to 1500 ft., employ a flat rope. A pulley is placed over a steam cylinder (it is, in fact, the piston), and the bore-hole is by the side of the steam cylinder, the rope being worked by means of the pulley, the cutting apparatus being of sufficient weight to ensure perpendicularity. The engineers who put down the great bore-holes near Paris employed ropes when the ground presented no features of importance, but in cases of difficulty they preferred what they considered the more trustworthy process of employing rods. The action of the piston up and down produces the blow at the bottom of the bore-hole, and as the flat rope is not subject to irregular torsion like the round rope, a collar is attached to the top, so arranged as to give the tool a new position at every blow. The result of this system is that Messrs. Mather and Platt have put down bore-holes to a moderate depth with quickness and economy. The cutter is sometimes made with separate chisels, four in number, on the edge or the tool, so as to leave in the centre a core or carrotte which is often brought up as long as a foot or a yard. Degouser has ere now contrived to extract a solid piece 6 or 8 ft. in length, and of such a diameter that it might serve as a pillar to a triumphal arch. When the chisel has been at work for some time, and it is wanted to extract the core, a cylinder is lowered with teeth on its inner side at the bottom. These by a rapid rotary motion scoop away the material until they get a firm hold, and then by a strong pull the core is broken off, and brought up bodily. A core (Fr. carotte) so obtained is valuable, as it enables the engineer to see the character of the deposit and the actual thicknesses of the bands and the lines of stratification of the material with which he purposes to deal. Such a specimen may be worth hundreds of pounds, and may settle that which otherwise would take a group of three bore-holes to determine, and which in the latter case might not be at all equal in certainty to the former. System and regularity are the two principal elements of success in putting in bore-holes. There ought to be accurate journals kept of the exact time occupied, and the thickness and quality of the strata inch by inch; and there should be a calculation in duplicate or triplicate of the contents of the bore-hole every time the sludger is put down, and the samples numbered to correspond with the journal. Various other kinds of rope are employed, as, for instance, those made of iron wire with a hempen core. Wire is a good material, but would not be useful in waters which have a corroding effect upon iron. The fibre of aloes has in some countries been used with great advantage. It may be a little invidious to mention cases in which total failure has taken place. There have been many instances both in this country and in France, of which a good deal has been heard, of their having attained 1000 feet and upwards, but there has been a mysterious silence as to their ultimate fate, from which we may conclude that some accident has occurred which could not be overcome—they have either passed out of the perpendicular, which could not be recovered, or something has fallen in upon the boring-tool, and so wedged it that the work had to be abandoned. I may mention that within the last few years the diamond has been applied to boring purposes, in a manner wholly unlooked for, and perhaps difficult to comprehend, until it is seen the effect produced by the trituration of this extraordinary gem pressed against the substance to be pierced with sufficient force, and made to revolve with great velocity.

This plan was hit upon a few years ago by a French engineer, who constructed an annular disc of iron or steel, in which was fixed at intervals a number of diamonds, projecting about ⅛ in. This disc is attached to a tube connected with a drilling machine, which also by means of steam or compressed air pushes the disc against the face of the rock, and presses it onward as it advances. The tube, as I have said, turns with great rapidity, and a strong jet of water passes through it to the point of contact, which washes away the detritus, and keeps the place clear for the action of the diamonds. [The lecturer here exhibited a core of some length taken by one of these borers from a piece of hard close-grained granite.] This was at first proposed to be used for the purpose of making holes for blasting, but it has been employed with success in America for boring holes to the depth of from 100 to 200 ft., and the rapidity with which the task has been accomplished is wonderful, bore-holes being made in ordinary material in days which would by the usual method take weeks to accomplish. At present it is expensive and inconvenient, but it is deserving of great consideration. Its expense has, compared with other systems, prevented it from receiving full attention, but it would be interesting to have it compared in actual work with other systems, setting its greater rapidity of performance against its costliness. Its advocates say that, all things considered, it is really cheaper than most other systems.

In most cases of ground we cannot advance a bore-hole many fathoms without putting in a lining, partly to keep back the influx of water from the adjacent country, and partly to prevent the walls being injured by the rods. These linings or pipes are made of divers materials. In olden times they used wooden pipes, and these when placed under water have turned out to be some of the best, the only objection being that they were of a thickness disproportionate to a small bore-hole, taking up too much space, while if the bore-hole be large, as at Passy for instance, it becomes a difficult and complicated question to put in wood. In ordinary cases now-a-days sheet-iron is used, but it has the drawback of being subject to the action of corrosive waters. Copper and bronze are applied when the water is acidulous, and zinc where it is sulphurous. At Grenelle copper pipes were put in, but not being made of sufficient strength they were squeezed together, and cast-iron had afterwards to be substituted. A great deal depends upon the welding together of the joints of the pipes. The first tube is placed within the bore-hole, or more probably several pieces of piping are fastened together, and put down all at once. Then another piece is put over it, and fastened to it, and pushed down. One of the admirable sets of tubing shown by Messrs. Degouser and Mulot at the Great Exhibition of Paris had screw joints. They were to be used at the great bore-hole put down at La Chapelle, near that city. The material of which they were constructed was the best boiler-plate sheet-iron, one centimetre in thickness. At that bore-hole, after putting down the tubes to a certain point, they could get them no further by hand. When this is the case it is the practice to place planks across the tube, and put great weights upon them, by which the tubes are often forced down to a considerable depth. Sometimes percussion is tried, but this is a dangerous expedient. When all has failed, and it is certain that that set of tubes can be got down no further, it is necessary to commence afresh on a smaller scale. After a time a similar difficulty may arise, and it may be necessary to begin again with a third set of pipes. If, then, that should prove successful the quantity of metal so used is but a trifle compared with the importance of the end attained. The great loss is the contraction produced in the diameter, which if the object be to obtain water or brine, is a serious drawback to the usefulness of the perforation. In 1869 I measured at La Chapelle the second set of tubes, which they were then putting in, and found them 5 ft. 3 in. in diameter, so that although the dimensions were somewhat diminished, there was still plenty of room for a large supply of water. In the case of the well at Passy, which goes to a depth of 1900 ft. before it reaches the water, they commenced with a diameter of 1 metre—that is, 3·28 ft. English—but they had to put in so many pipes that a much smaller volume of water was produced than was expected.

The expense of boring naturally varies according to the nature of the ground to be pierced. In many districts it is usual for a person to keep sets of boring-rods, and undertake the work when required by owners of minerals or mine agents, and there is a regular tariff for such work. A few years ago, in the neighbourhood of Newcastle, the charge was arranged in the following manner:—For the first 5 fms., the payment would be 7s. 6d. per fathom; for the next 5 fms., 15s. per fathom; for the next 5 fms., 22s. 6d., and so on increasing 7s. 6d. per fathom in fives down to 100 fms., beyond which special bargains would be made. Thus, the increasing depth increases the cost in a ratio which makes boring very expensive. These charges, moreover, must not be reckoned upon as invariably conclusive, as the borers always expect extra pay when they come to what they call "whin," a name they give to any exceptionably hard stone; and cases have been known in which bore-holes have been stopped on account of the great expense arising from the extra hardness of the rock, and the extra charges consequent upon this fact.

I cannot conclude without mentioning the extraordinary success of Messrs. Kind and Laurent in putting down bore-holes of dimensions formerly considered impossible, and, indeed, large enough to serve the purposes of actual shafts. The advantage is, of course, that they can work with the hole full of water—a *niveau plein*, as the French have it: 20 years ago attempts were made by these very engineers themselves without success; at least, if they were successful up to a certain point they failed to secure the water sufficiently for the men to go down; and the contrivance by which they were enabled to overcome the difficulty is comparatively only a few years old. It was at the Exhibition of 1862 that attention was generally drawn to the works they had then done—putting down bore-holes 14 ft. in diameter to a depth of 150 yards, or more, with very great success. Within the last few months they have given an account of their apparatus, and the expense of working it, in the Transactions of the Miners' Institute of the North of England, which you will find in the Library upstairs, all represented to scale. You will see that their great cutters are 14 ft. in diameter, armed with a series of extremely powerful steel teeth, and weighing as much as 16 tons. These tremendously ponderous tools are suspended by iron rods attached to a series of wooden rods, the former being made of the best hammered iron. Of course, the machinery for raising the cutter to make way for the sludger is of the most powerful description. I should have mentioned that in making these large bore-holes they begin with a smaller diameter, (say) 4½ ft., and when a certain depth has been reached the tool is removed, and one for an enlarged diameter put in.

## SOUTH STAFFORDSHIRE AND EAST WORCESTERSHIRE INSTITUTE OF MINING ENGINEERS.

The annual meeting of the members was held, on Monday, in the Geological Museum, Mechanics' Institution, Dudley. Mr. JOHN FIELD was voted to the chair, the President (Mr. Cooksey) and the Vice-President (Mr. Checkley) being unavoidably absent. There were present—Messrs. E. Davies, J. Lindop, A. H. Lindop, W. Spruce, T. Brettell, R. Evans, T. Parton, T. Latham, G. Taylor, J. Ritson, J. Hughes, W. Blakemore, H. M. Morrison, J. Bower, J. Getting, S. B. Ensell, T. Lloyd, J. Rogers, J. Cole, I. Williams, C. Lawrence, W. Evans, W. H. Hall, H. Johnson, sen., H. Johnson, jun., T. Llewellyn, J. Lawley, F. Holcroft, M. Fletcher, G. Spruce, and R. Latham.

After some formal business, the annual report of the council was read by Mr. H. JOHNSON, jun., and adopted.

The CHAIRMAN announced that the result of the scrutiny for the election of the officers for the ensuing year was as follows:—President, Mr. Henry Johnson; Vice-President, Mr. William Blakemore; treasurer, Mr. T. Latham; hon. secretary, Mr. H. Johnson, jun.; council, Messrs. J. Cooksey, J. Whitehouse, T. Checkley, S. Bayley, J. Cole, and S. B. Ensell; auditors, Messrs. T. Brettell and J. Hughes.

Mr. JOHNSON having been duly installed in the presidential chair, read his inaugural address—He thanked the members for the honour they had conferred upon him, and spoke of the report as an encouraging one. After speaking of the benefits of such an institute, Mr. Johnson mentioned the following subjects as specially worthy of the consideration of the members:—The new nine-hours movement, the lax mining discipline of the district, ventilation by steam-jet, and compulsory drainage of the mines in that district. As to the first, he entirely agreed with the action of the masters at the meeting on Friday, and was for a uniform system of weights, so that everyone might know how they were trading. The masters, after the concession, had a right to demand that the men should work on Mondays. In no district in England had the miners so many privileges as in that district. As to the lax discipline, they had no need to look further than the Black Lake accident, where eight persons lost their lives, and six women and thirty-seven children were left helpless, through the night-men going to sleep whilst a lighted candle was carelessly left in the stable. Individual responsibility was the only cure for such a state of things. At present the owner or agent had all the care, and the subordinates got off "scot-free." As regards ventilation by high-pressure steam, I have recently had an opportunity of proving its value as an immediate, effective, and safe agent for that purpose; and I think it would be a valuable application in working the ribs and pillars of thick coal in this district. By it the ventilation is increased, decreased, or shut-off, at will, as circumstances require, and this, in my judgment, is the sort of application most needed for ventilating ribs and pillars. It was applied in the recovery of the bodies at Black Lake Colliery, after all other means had failed, and it effected the purpose in a few minutes. I see Mr. Scott has taken out a patent for its application on an extended scale, and I learn that that gentleman has promised to lay it before this institute on an early day. As to the necessity for the compulsory drainage of mines, it became more apparent day by day. There were ponds of water at Bilston, Tipton, Old Hill, Bromley, and Kingswinford. In Tipton the owners had agreed to keep their compact some time longer, in order to consider the effect of compulsory powers. In order to bring the matter before the meeting, he had made a few abstracts for a proposed Bill, which would be brought before Parliament during the coming session. [This subject has been fully referred to in previous Journals.] Mr. Johnson concluded by trusting that the year might be productive of greater usefulness than previous ones. The address was received with applause.

The PRESIDENT then read the report of the council, which stated that they had the pleasure to report that the Institute continued to progress. In conclusion, the council invited interesting papers from members on subjects relating to mining operations, and trusted that the Institute might increase in utility from year to year.

Mr. Frederick Silvester, mechanical engineer, Castle Hill Foundry, Newcastle-under-Lyme, and Mr. Richard Haines, coalmaster, Church-lane, were elected members.

Mr. H. M. MORRISON, M.E. (Manchester), read a paper on "Shaw's American Compound Propeller," and illustrated it with diagrams. Up to the present the Cornish pumping engine has been considered the most efficient machine for elevating water from mines, or for raising large volumes of water for the purpose of irrigation, or the supply of large cities; but, while its efficiency is acknowledged, its great cost is often a standing objection to its use. This fact has induced inventors to turn their attention to introducing a cheaper class of pump to approximate, as far as possible, to the Cornish engine in economy—a feature in which it excels. Consequently, the turbine pump has been brought very prominently forward as its great competitor; but when the height to which water is to be lifted is considered, as is always the case in mines, the use of turbines is out of the question, as they, acting by help of the centrifugal power of the water, are only able to lift it to a limited height, which when once reached cannot be exceeded, whatever be the power applied, or the velocity of the rotation. Attempts to construct a succession of turbines in order to cause the water to reach the required height, have not been successful, chiefly for reason of the complication, and the subsequent loss of power; and there have been thus far no available means of raising water to great heights than the method of the intermittent motion of the ascending column by means of the to-and-fro motion of the pump pistons. Shaw's invention disposes of the turbine and centrifugal principle, and applies that of the propeller or screw; and by placing the axis of the propeller vertical, and both in a tube, the water is thrown up with the same force that in a screw-steamer it is thrown backward. As, however, this force extends only to the height of a few feet, other propeller blades are attached to the same axis, at different points, so that the next blade above takes the water thrown up by the lower one, and drives it upward to the next, and so on, till it reaches the required height, whatever this may be.

## SCIENCE IN THE MINE.

Mr. TOM PARTON, F.G.S., Willenhall, read the following paper:—

England is to-day eminent in the art of mining. She has not always been so. The early history of mining discloses to us long ages of rude art. A century ago we were using appliances in mining which were well known, and adopted by the Germans 200 years before. Perhaps it is not generally known that the gin, water-wheel, and chain-pump were introduced into this country by the Germans, during the reign of Queen Elizabeth and the Stuarts. Mining operations, as conducted by the ancients, were confined to districts where outcrops of coal were discovered, and along the strike of such seams do we find evidence of their labours. Their skill in this art was very limited. Not many yards out of the daylight could they win the fuel, for want of hauling and draining machinery. We do not read of wind-mills being made subservient for drainage purposes. Science was scarcely known as a handmaid in the days referred to. Empiricism reigned. We should do no wrong to deprecate the value of the works accomplished, or to undervalue the importance of principles founded by the sheer labour of hand experience. Early mining has laid the foundation stones of the vast and extended fabric of mining industry we so pride ourselves of now. Still, we think mining would have remained to rude ruin, without any power to development, which so astonishes the world at this time, had not science, in various ways, applied her magic power and vitality. So soon as applied science and emiricism battled together we find immense progress in all pertaining to mining industries. In this paper we propose to notice the bearings of science on the rise and progress of mining; also, as it affects the safety and economical operations of this mundane industry. Details of every application science has made cannot possibly be given in the limits of a paper. We only can notice a few of the principles. Each member can find profit and pleasure in studying details at his leisure. We direct our attention, in the first place, to the science of geology. We do this because our forefathers themselves were, without knowing it, practical geologists. They, in their rude researches, taught valuable lessons in practical geology. They unclothed nature, and showed to light her treasures, their position, character, and direction. They proved that certain well-defined seams of coal extended unbroken through large districts, along brooks and valleys, and in mountain sides. They had no power or ability to classify. Not till Wm. Smith appeared on the scene was there any clear and distinct idea of the contemporaneous strata being capable of identification by their mineral and organic character. With his keen faculties for observation, and a mind of the true philosophic order, he soon discovered how one stratum succeeded another in regular stratigraphical order, each particular one having a place in the series, and each formation in its particular position in the great series of rocks forming the crust of the globe. By this combination of observant induction and speculative power he makes out on his map spots where coal fields may or would be found, and spots where they would not; and he established the all-important and fundamental law in geology of superposition. The practical application of this, as it affected the art of mining, was seen in tempting speculation in those districts most likely to contain mineral according to the law above stated. In Smith's day thousands of pounds were spent in fruitless efforts to discover coal where Smith was quite sure none would be found. Our lamented friend, Mr. Jukes, in one of his works, also says: "Very few people are aware of the enormous amount of loss which has been incurred, and is even yet of annual occurrence, in fruitless mining enterprises." "Sedgwick on a visit to Sir H. Halford, in the south part of Leicestershire, saw an engine, &c., on the top of a hill a few miles off, and was told it was for a coal pit. He naturally went to look, and going up the hill found lias shale with lias fossils. 'Truly (says he) this is lias.' 'Lias (says the proprietor), you are a liar, and you are all liars together.' The man ruined himself." "In South Staffordshire (says Mr. Jukes) I know two instances of ground bailiffs, intelligent men, well versed in coal-getting, continuing to sink in Silurian shale, and heaps of the fossils of that formation lying on the pit bank; they were still going down for coal." Jukes continues: "The names of these stories are legion. The money wasted in this century for the want of the very rudiments of geological knowledge in those who wanted it, would have paid for the whole survey and museum since its establishment, and given it an endowment of 2000*l.* forever." Geology gives us an acquaintance with the nature of the disturbances which have so broken up the crust of the globe. With a practical knowledge of mining, it enables us to better understand the nature and extent of faults, dykes, &c., so commonly met with in our coal fields, and unravels the mysteries of surface and subterranean springs. Mechanics—*i.e.*, the science of motion and moving forces—comes next in importance. After the discovery of minerals, or the probability of their existence, we require that kind of technical knowledge which will enable us to extract such out of the varied position in which nature has placed them. The ancients, as we have previously noted, under-stood and applied mechanical powers to mining purposes. But the powers of the wheel and axle, balance and lever, pulley, wedge, screw, &c., were very limited, and mining was confined to a low ebb, without the assistance of the life, blood, and steam. So soon as the latent force of steam was proved and applied a new era in mining was inaugurated, and each coal field was, as it were, brought within the grasp of its owners. It is supposed that Savery first employed steam-power in mining for raising water in the year 1696. Several were soon erected in parts of England. The inventor had a high opinion of them, for he says—"I will raise your water 500 or 1000 feet high could you find us a way to procure strength enough for such an immense weight as a pillar of water that height, but my engine, at 60, 70, or 80 feet, raises a full bore of water with much ease." This class of engine was superseded by Newcomen's atmospheric engine, about the year 1705. In 1711 one was used for mining purposes. In 1712, Newcomen and Crawley entered into a contract to raise water by steam for a Mr. Black, of Wolverhampton. Mr. Dunn says: "The first steam-engine erected near Newcastle was put up at Byker in 1714, by the son of a Swedish nobleman. Then engines were worked by atmospheric pressure above the piston, whilst the vacuum beneath was created by the injection of water into the cylinder; the alternate movements were executed by the hand of an attendant until 1718, when a Mr. Beighton invented a method of performing this operation by means of the engine itself." This engine was capable of raising 5,000,000 lbs. 1 foot high by the expenditure of one bushel of coal. In 1776, Watts improved upon this, and his engine yielded an average of 18,900,000 lbs., with same amount of fuel; in 1800, average duty increased to 20,000,000; in 1820, average duty of 37 Cornish engines to 28,736,000; in 1828, average duty of 54 Cornish engines, 37,000,000; in 1856, average duty of 46 Cornish engines, 44,650,000; some have reached to 100,000,000.

We can all testify to the immense development of mining in consequence of the application of steam machinery to both pumping and winding. Mines have been, and are now being, worked from depths which are astounding. Difficulties in sinking the vast quantities of water have been surmounted. As an instance we may mention a case in Durham, where springs were met with which supplied 10,000 gallons per minute. To battle with this water, and much quicksand, the following engine power was issued:—Three pumping-engines of 350-horse power each, 1050; two winding engines employed in pumping, 130 each, 260; one ditto, 100; two ditto, 25 each, 50; one ditto, 18: making total horse-power, 1478. A wide field is open for individuals and societies of this kind for exercising the inventive faculty in still further improving the appliances of machinery for various mining uses. In one direction, particularly, we should devote more than ordinary attention—*i.e.*, in experimenting on the best means of cutting coal by machinery. Much has been saved in the haulage department, but little in the saving of labour and fuel, by using machinery in lieu of bone and muscle. There is, doubtless, much labour, irksome and wearying in the mine, which can be done by the aid of steam or other power applied to the "iron man," or coal-cutting machine. There are two aspects in which we may study this question—viz., the economic and safety. Even at this epoch in the history of mining, a great proportion of our minerals have to be extracted from great depths, and with considerable danger. Any application of science by which economy and safety can be realised will be received as a boon, and it is the duty of all connected with mining to use their talents in this direction and with this aim, apart from any selfish motive. Inseparably connected in relationship with the previous remarks is the knowledge of hydrostatics and hydraulics. Hydrostatics treats of the weight of equilibrium, of non-elastic fluids at rest. When that equilibrium is destroyed motion ensues, and the science which considers the laws of such fluids in motion is called hydraulics. *Fluids* may be considered of two kinds, non-elastic and elastic or compressible. The former are water, oil, and mercury; the latter air, vapour, and gas. Before the dynasty of the steam-engine, the drainage of mines was not successfully coped with. It was not till the philosophic minds of our early engineers discovered the principles of the science in question that any headway was made. The pressure of fluids offered great difficulties in early mining. Futile attempts were made to dam back springs of water in shafts and workings.

Many records do we find of great loss of life and property by insecure provisions against the weight of water in unseen springs. It is now well proved that fluids, unlike solid bodies, press in every direction equally. Water always fluds its own level unobstructed. From this principle we understand the construction of fountains, and what is of more importance, the formation of subterranean springs and Artesian wells. Fluids also press in proportion to their perpendicular height, and the area of vessels containing them, without any regard to their quantity. If one vessel be in the shape of a cylinder, and the other in the shape of a cone, if the bases and the perpendicular heights are equal, the pressure will be equal, although the solid contents, and consequently the weight of the cone be only one-third that of the cylinder. When ponds of water are being dammed back, especially where the size and form of the room to be filled is known, a knowledge of this principle is invaluable. Another important principle is what is called the hydrostatic paradox—*i.e.*, that a quantity of water, however small, may be made to counterpoise a quantity however large; thus, if we pour water into a vessel containing a spout it will stand at the same level in both parts, consequently there is an equilibrium between them. In all collieries where there is water to contend with the principle can be seen in force where workings are at various levels, and drained by levels into a sump. If the water is allowed to rise, it soon shows itself in the little valley, even though hills may intervene. Often water has found its way for hundreds of yards through old works and levels, to the puzzle of the agent and attempts made to drain; whereas if this principle had been thought of, he might have known that such water was the level of a large pound which was gradually rising. For want of space we must pass over other details of this branch with giving a few rules for estimating the pressure of fluids, &c. To find pressure of fluids on horizontal surfaces multiply the height of the fluid by the extent of surface upon which it rests. The product gives the bulk of the fluid, the weight of which is equal to the pressure. Thus, if the surface be 6 feet square, and the height of the fluid 3 feet, the pressure is equal to the weight of 18 cubic feet. If water, a cubic foot of which weighs 62½ lbs., the pressure is equal to 1125 lbs. To find the pressure on surfaces not horizontal. The pressure is equal to the weight of a bulk of fluid, found by multiplying the extent of the surface on which its rests into the depth of the centre of gravity of that surface. To find the pressure of fluids in cylinders, whether in the shape of hollow tubes, wells, or shafts, multiply curved surface under water by half its depth in the water. Thus, if a pipe be 20 feet high, diameter 4 ft., the calculation is 20 ft. by 4=80 3·2=252 square feet, which being multiplied by half the depth, 7lb by 252=2520 cubic feet of water, or above 70 tons pressure. Hydraulics explains the laws of non-elastic fluids when in motion, and the action of various kinds of machinery in connection with their motion. It is this disquietude of fluid which so often disturbs the equilibrium of the mining engineer. If he could, by some power unknown, say to the water "So far shalt thou come, but no farther," he would be a happy individual. But 'tis not so. We can seldom penetrate many yards into the crust of the globe without disturbing springs of water, and it often taxes the utmost skill of the engineer to conquer the enemy. There are two influences by which water is set in motion—increased or decreased pressure of the atmosphere, which causes it to rise above its own level; and its own gravity, which induces it to find its own level. The ordinary means for raising water is by means of the pump. This is our most useful hydraulic-machine, and is by no means modern. It was invented by one Aesbes, a mathemetician of Alexandria, about 120 years B.C. There are several kinds—sucking, lifting, forcing, chain-pump, centrifugal. The principles by which water is raised with the machines, bring us to our next branch—viz., pneumatics, which treats of the mechanical properties of air and other elastic fluids. This is the most important branch of science in connection with the chemical properties of air with which the miner has to do. Upon a sound acquaintance with its laws and principles depends the safe working of the mine. Its laws are disregarded through ignorance or negligence, and we lament destruction to life and limb.

Our forefathers, in the same way in which they were practical geologists, were practical meteorologists. They, in their underground experience, found out that the air did not always go through the workings the same. Some days they would have good ventilation; other days they would be "dampy." We have heard old colliers, who could not read a letter, say "It will be dampy to-day, for the wind is coming out of the 'suds hole'!" meaning that the wind was driving from the south. In what way it affected the ventilation of the mine scientifically they knew not. Yet we find these men adding to their wisdom. To increase the circulation of air they would hang a lamp of fire in one of the shafts. This they would say in some mysterious manner "sucked the air up." This study teaches us that the air composing the atmosphere is "a spherical shell, which surrounds our planet to a depth which is unknown to us, by reason of its growing tenuity, as it is released from the pressure of its own superincumbent mass. . . . It surrounds us on all sides, yet we see it not; it presses on us with a load of 15 lbs. on every square inch of surface of our bodies, or from 70 to 100 tons on us in all, yet we do not so much as feel its weight." Like water, it presses equally in all directions. If we withdraw the air from any part of our bodies its pressure is soon felt. For instance, if the air is "withdrawn from a thimble and placed on the fleshy part of the arm, the pressure of the air on the thimble not being counterbalanced by air within, causes it to be forced down upon the skin. This pressure of the air is equal to a column an inch square reaching from the surface of the earth to the extreme height of the atmosphere, which is of the same weight as a column of water 1 in. square and 34 feet high; or of a column of mercury 1 in. square and 30 in. high. Upon this principle, then, depends the action of our pumps. The air is removed out of the pump trees below the working barrel, and the weight of air on the surface of the water presses it through the clack. Until Galileo's pupil, Torricelli, discovered that the atmospheric pressure would support a column of mercury in a tube hermetically sealed at one end to the height of about 30 in., there was no means of ascertaining the fact that the atmosphere was not always of the same density. While it would not support more than about 30 in., it was found to oscillate between 27 in. and 30 in., thus showing that the pressure under certain circumstances was considerably lower than at others. For instance, "When the barometer is at 27·00 in., the pressure per square foot is equal to 1908·23 lbs. per square foot; at 28·00 in., equal to 1978·90 lbs.; at 29·00 in., equal to 2049·58 lbs.; at 30·00 in., 2120·25 lbs.; at 31·00 in., equal to 2190·90 lbs. This unravels the mystery which puzzled our early miners, and very often our modern ones. Empiricism gave the fact that the state of weather influenced the state of ventilation. Science explains the why and wherefore. Empiricism, by painful experience, has long since proved the results of sudden atmospheric changes, and yet, even now, too frequently refuses to adopt the means science has supplied for ensuring greater regularity of air currents, and consequent safety. What has science wrought, and what does it teach us? First, that the air is not always of the same density. Second, that air filling any sort of chambers connected with each other, and of the same density, will be equally balanced, and hence no current. Third, that the air is elastic, yielding to pressure. Fourth, air is compressible. Air may be condensed by artificial means into fifty thousand times less space than it usually occupies. Because we know the air is not always of the same density, we use the barometer to inform us. To neutralise the injurious effect of this variation of density in our mines, we take advantage of the elasticity of the air, and use artificial means to regulate the density in at

least one of the openings out of the mine. A very important means for accomplishing this result is the furnace. It is proved that by heating a column of air we expand it about 1-450th of its volume for every degree of temperature. By this the column of air, rushing down the down-cast shaft at ordinary temperature of the surface, has a density in excess of the expanded and lighter air in the upcast. Hence the old fashion of hanging the lamp in the shaft, producing a current which would not exist if the air in both shafts was of the same temperature and density. A thorough understanding of these principles is indispensable to the safe working of our mines, more especially those which give off large volumes of explosive gases. It is easy to understand how light explosive gases, pent up in the pores and crevices of strata, will rush from their hiding-places when the atmospheric pressure suddenly lessens and checks ventilation.

Mr. J. Lindon exhibited a section of the recent deep sinking at Aldridge, by which the Cannock Chase deep and shallow coals have been discovered in the district; Mr. E. Marten, C.E., of Stourbridge, model of South Staffordshire coal field, and very interesting models of the effects of steam boiler explosions; Messrs. Bury and Co., Sheffield, their patent colliery picks; and Messrs. Hydes a patent miner's gas alarm lamp. To this lamp the silver medal in the first-class was awarded at the London Workmen's International Exhibition, and it has been highly commended.

NEW ORGANIC COMPOUND.—At the Liverpool Chemists' Association, Mr. Alfred H. Mason, F.C.S., exhibited a specimen of a new organic compound called "Croton Chloral," which he said was formed by conducting chlorine gas into allylene. A peculiar action of this new substance was, that whilst a high degree of anœsthesia in the head was produced, sensibility in the other parts of the body remained intact. The value of this peculiarity in cases of mania or insanity it would hardly be possible to underrate. It was probable that croton choral would produce all the good effects of hydrate of choral without any drawback being attached to its judicious use.

MECHANICAL PUDDLING, AND THE IRON AND STEEL INSTITUTE COMMISSION.—The report of Messrs. Snelus, Jones, and Lester, containing an account of their investigation into the working of the Danks's rotary puddling furnace in America, has just been issued as a separate part of the "Journal of the Iron and Steel Institute" (London: E. and F. N. Spon, Charing Cross), and as the experiments were made with ores and fettling materials sent out from England, and such as are commonly used in this country, the value of the information cannot be over estimated. The essential feature of the report is that it declares the apparatus by Mr. Danks to be a success, and that the question of mechanical puddling is satisfactorily solved. In the opinion of the Commissioners, not only is the mechanical process practicable, but it clearly gives much better results in many respects than ordinary hand puddling. The statement that the fettling is reduced in the machine is fully confirmed. The quality of the iron is also improved, the output is increased, and altogether it is evident that, on the whole, considerable economy is attainable under the new system. They are satisfied, on the whole, that the quality of the iron produced is materially improved by this process. On fracturing the squeezed bloom they found it presented an open, spongy mass, as though it had not received sufficient compression, and also presenting tokens of the presence of a quantity of cinder. There can be no doubt that this is the case. On the bloom, however, being re-heated and rolled into a bar it parts freely with its cinder, and in the fracture of the bar they were not able to detect the presence of more of it than is found in any other puddled bar. The bar in fracture presented the appearance of that of an ordinary puddled bar. In the various blooms which they fractured they searched for pieces of unreduced fettling, and discovered several pieces in one bloom, but only in one. The others seemed in the fracture to be free from it. They had anticipated that this ugly fracture would have presented itself more freely, but admit that in the subsequent working of the iron it did not bear out their anticipations. With stronger squeezing and rolling machinery no doubt the cinder can be more effectively removed on its first manipulation after coming from the puddling-furnace, but they do not expect that the sponginess in the bloom, to which they have before alluded, will have disappeared by that improvement. It may be necessary, in order to get a close and compact fracture in the bloom, to resort to hammering, but on this point they cannot at present offer any decided opinion. It may be, and it is probable, that the sponginess is no detriment to the quality of the iron, after having been worked in the subsequent processes. Whether the re-heating from the squeezer will be found to be indispensible is a matter they cannot well determine now. On rolling off a few pieces the result was not satisfactory. It may have been due, and probably was, to the somewhat imperfect manner in which the bloom had been squeezed. Finally, the Commissioners are of opinion that they have collected facts sufficient to enable the committee to form a decided opinion upon the commercial bearings of the invention. With coal, fettling, and repairs given, and yield of puddled bar from pig, and quantity turned out in a given time, it will not be difficult for anyone engaged in the manufacture of iron to determine the bearings of this matter. The machines they experimented on are in an early stage of the rotary process of puddling, and immense strides can rapidly be made in developing the process, which strides will materially affect the commercial bearings of the matter as it now stands. At present they are agreed that the rotary-furnace as it now is offers advantages commercially over the old process.

## FOREIGN MINING AND METALLURGY.

In the Meurthe and the Moselle the iron trade displays great activity, and the creation of several important establishments is reported. At St. Dizier transactions have been rather active, and prices have been firm and well sustained. Rolled iron from charcoal-made pig is quoted at 9*l.* 16s. to 10*l.* per ton first class; coke-made iron, 8*l.* 4s. to 8*l.* 12s. per ton; mixed iron, 8*l.* 16s. to 9*l.* 4s.; special iron, 9*l.* 12s. to 9*l.* 16s. per ton first class; and hammered iron, 10*l.* 16s. to 11*l.* 4s. per ton. Refining pig has varied from 4*l.* 16s. to 5*l.* per ton, and mixed pig has brought 4*l.* 4s. per ton. In the Loire group metallurgical industry is stated to be in an excellent condition; in the Eure it displays a tendency to revive. The works of MM. Ernest Goein and Co., in the Loire-Inférieure, which have been closed for some time, will, it is expected, be shortly re-opened.

Notwithstanding the advanced period of the season, the consumption of coal does not appear to slacken in France, and prices remain without variation. Deliveries are made with more regularity than hitherto, and industrial establishments do not, consequently, apprehend the delays which have been so disastrous to them of late. The great and difficult question of internal navigations has been attracting at present the attention of the most competent men in France, and various plans for an improved system of transport organisation are under serious consideration. Should some of these measures be practically carried out, together with those adopted by the Government with reference to railway traffic, results are hoped for in future which will give satisfaction to all concerned.

A strike of considerable gravity has occurred among the miners employed in the collieries of the Charleroi basin. The movement has rapidly extended itself in all parts of the basin, but it has not affected at present the Mons and Liége basins. The Charleroi miners demand in future to be paid by the day instead of by the task-work system as hitherto; the proprietors of the collieries are unanimous in rejecting their pretensions. How the strike will terminate it is difficult to foresee; but if it should be continued it will occasion great injury to the general industry of the district, and bring famine and misery into the homes of thousand of workmen.

The French copper markets have been generally quiet; the uncertainty prevailing as to the proposed taxation of raw materials is the principal cause of this state of affairs. At Paris, Chilian in bars, delivered at Havre, has made 90*l.*; ditto in ingots, 94*l.*; English tough cake, 96*l.*; and Corocoro minerals, pure standard, 92*l.* per ton. At Havre a sale is noticed of 121 tons, first and good marks, at 88*l.* to 90*l.* per ton, Paris conditions. At Marseilles, Spanish has made 82*l.*; refined Chilian, 84*l.*; red copper for sheathing, 92*l.*; and yellow ditto, 88*l.* per ton. The German copper markets present a satisfactory aspect; great activity generally prevails, and prices are firm. The French tin markets have been tending downwards. Banca tin, delivered at Havre or Paris, has been quoted at 157*l.*; Straits at 156*l.*; and English, delivered at Havre or Rouen, 156*l.* per ton. The German tin markets have also lost much of their firmness, in consequence of the advices received from London and Holland; the fall thus far has not, however, been at all considerable. Affairs in lead have been acquiring more importance of late upon the French markets; the article has also been in more demand in Germany, and it appears probable that prices will be well sustained for some time. At Paris, Silesian zinc, delivered at Havre, has made 24*l.* 12s.; other good marks, delivered at Havre, have made 24*l.* 4s.; ditto at Paris, 24*l.* 4s. per ton. Rolled zinc has been dealt in at Paris at 28*l.* per ton, being an advance of 4s. per ton. Upon the German zinc markets prices have been firm.

Prices of coal have remained firm in the Charleroi basin. The last quotations which have come to hand place domestic qualities at 15*l.* 10s. per ton. In the Liége basin coal and coke are very firm. Means of transport, which had improved early in the month, appear to have again become insufficient, and numerous complaints have arisen in consequence, while the execution of numerous orders has been delayed. The exports of coal from the Couchant de Mons amounted in the first eleven months of last year to 2,261,628 tons, against 2,180,079 tons in the corresponding period of 1870. The coke made in the Borinage being principally consumed in France, and trucks having almost constantly made default. On the Northern of France and Eastern of France Railways, the exports in the first eleven months of last year only amounted to 123,830 tons, against 192,361 tons in the corresponding period of 1870. The dividend on the preference shares of the Esperance Collieries, Blast Furnaces, and Rolling Mills Company for 1870-71 has been fixed at 16s. per share. The North of Charleroi Collieries Company has been paying a dividend of 18s. per share during the last few days.

The Iron Trade of Belgium continues in a favourable state. Difficulties are still experienced here and there in obtaining supplies of raw materials, and industrials find it impossible to accept all the orders which reach them, their productive powers being engaged for some time in advance. In consequence of the increasing dearness of raw materials, the continued advance in the cost of labour, the difficulty of obtaining special iron, and the abundance of orders presenting themselves at more and more remunerative rates, many manufacturers of plant are bitterly regretting the contracts into which they entered in the first six months of 1871, and with the execution of which they are now proceeding. A striking proof of the activity which now prevails may be found in the fact that at the last adjudication of plant for the Belgian State lines tenders were not delivered for all the carriages and trucks required. Contracts for the coal trucks ordered were shared between six establishments, at prices ranging between 101*l.* per truck (Haine St. Pierre Company) and 103*l.* per truck (Messrs. Cabany and Co.); the average price was 101*l.* 0s. 11d. per truck. The coke trucks ordered were contracted for at prices ranging from 122*l.* per truck (Messrs. E. Noulet and Co.) to 133*l.* 16s. per truck (Belgian General Railways Working Company): these trucks were contracted for by eight competitors. The demand for rails and railway plant is increasing throughout Europe, and the future presents itself under such an encouraging aspect that several new railway plant construction companies are expected to be formed in an early future. In addition to the credit of 483,200*l.*, opened for the Department of Public Works for additional supplies of rolling-stock, the Minister of Public Works has applied for a credit of 160,000*l.*, intended to be devoted to the improvement of the permanent way on the Belgian State lines, and improved appliances for the loading and unloading of goods. The Liége Association of Engineers has received an interesting report from MM. Raskin and Grenier on iron, pig, and steel, in connection with the revision of the Treaty Commerce concluded with France.

## AUSTRALIAN MINES.

YUDANAMUTANA (Copper).—Mr. Martin, Blinman, Nov. 26: You will, I am sure, be glad to hear my opinion of the mine, and especially Hill's great lode. Since my arrival on the mine I have been all over it three times, and, so far as I am able to judge, nothing has been said that the appearances do not justify, for Hill's lode as it now appears is truly a wonderful lode, and from its being cut in the shaft I think it will open out still larger and prove permanent, but I do not think anything will be done in working upon it for six weeks, as the shaft must go down a few fathoms more to drain it. I have raised the price of dry wood is. 6d. per ton, as I am determined to have all the five furnaces in full work before I leave the colony. There is no scarcity of wood, for abundance is to be had for many years to come.—Capt. Terrell reports, Blinman Mine, Nov. 27: Since my last I have put a pare of men to sink on the lode of ore we cut in driving from the 35 to the engine-shaft, and am pleased to say that this place is looking very well, and turning out some rich carbonate ore. Ore raised, 158 tons; smelted, 171 tons; copper made, 13 tons.

PORT PHILLIP AND COLONIAL (Gold).—The quantity of quartz crushed during the four weeks ending Nov. 8 was 4923 tons; pyrites treated, 20 tons; gold obtained, 1414 ozs. 11 dwts., or an average per ton of 5 dwts. 8 grs. The receipts were 5336*l.* 13s. 1d.; payments, 4605*l.* 5s. 6d.; profit, 731*l.* 7s. 7d., added to which was last month's balance, 1346*l.* 0s. 9d., making 2077*l.* 8s. 4d. The return for the two weeks ending Nov. 22 was—Quartz crushed, 2285 tons; pyrites treated, 17 tons; total gold obtained, 571 ozs. 4 dwts., or an average per ton of 5 dwts. The company have also received the following telegram, dated Galle, Jan. 22, in anticipation of the mail leaving Melbourne Jan. 5, and due here Feb. 19 next:—Month ending Dec. 6, yield per ton, 4 dwts. 22 grs.; fortnight ending Dec. 20, yield per ton 4 dwts. 16 grs.; remittance, 600*l.*; western deep level, 12 dwts.

YORKE PENINSULA.—The directors have received advices from the committee at Adelaide, with reports from the Kurilla Mine to Dec. 4. The following are extracts from Capt. Anthony's report: "At the 15 fathom level, west of Deeble's shaft, 3½ fathoms have been driven on the main lode; the lode is of a fair size, and not destitute of ore in any part, but not in sufficient quantity to pay. It is desirable to continue driving this level in order to ventilate the 25 and render available any ore in the back of the same.—The 25 fm. level, west of Deeble's: The extreme hardness of the ground here has limited the driving of this level to 1½ fathom since my last, but it is that further length of paying ground, added to the 16 fathoms reported then, and which I hope soon to be placed in possession of the means to turn to profitable account. Since my last report, dated November 6 last, the branch mentioned therein has yielded 5 tons of good ore, but while there is still some rich ore in the back of the drive it is poor downwards. It is my intention to follow this branch a little further, as it is evidently a feeder to the main lode or a connecting vein with a parallel lode not yet discovered. I have about 20 tons of good ore ready for bagging, and about 6 tons more to dress."

ENGLISH AND AUSTRALIAN (Copper).—The directors have received advices from their manager, dated Port Adelaide, Dec. 6 last. The stock of coal on hand was 288 tons. All the seven furnaces at Port Adelaide were in full work. Since last advices shipments to the extent of 1·3 tons copper had been made.

SCOTTISH AUSTRALIAN.—The directors have received advices from Sydney, dated Dec. 1, with reports from the Lambton Colliery to Nov. 29: The month of November not being quite completed, the return of sales of coal for that month had not been made up, but up to the 29th they amounted to 5316 tons. The coal trade was very slack, the supply continuing to exceed the demand, and a slight reduction in the price of the company's screened coal ranging, according to extent of purchases, from about 3d. to 6d. per ton had been temporarily made, to take effect from Dec 1 last. The price of their small coal was to be raised about 6d. per ton from Jan. 1.

ANGLO-AUSTRALIAN (Gold).—The directors have received advices, dated Fryerstown, Dec. 4. Mr. Kitto writes—"Since I last wrote you we have discovered what appears to be a good lode about 100 feet from the southern boundary of our mine (within) at a depth of 40 feet from the surface. Tradition said that some 17 years ago a Mr. O'Sullivan obtained 20 ozs. from 1¼ ton from this spot, and it appears quite likely, judging from the appearance of the stone struck by us. Tenders have been called, and will be opened to-morrow, for the supply and erection of 15 heads of revolving stamps with amalgamating apparatus, together with the necessary buildings and connecting gear of sufficient strength to drive 50 heads." Captain Ralsbeck reports to Mr. Kitto, Nov. 4, as follows: "I have the honour to report progress in above mine since the 6th ult. No. 2 engine-shaft west has been sunk since above date 20 feet, and 25 feet secured with timber. The sinking has been through a strong run of slate, but ground at present in bottom is hard, close-grained sandstone. Total depth of shaft 181 feet. In the shaft south of No. 2 engine-shaft cross-cut has been driven east 35 feet; at 14 feet from shaft a leader (mentioned in my last report) was struck from 3 to 4 feet thick underlying west; the western portion of this vein is very rich, and will yield several ounces per ton. From 2 to 3 dwts. of fine free gold can be obtained by sampling with a dish, as well as a number of quartz specimens—some very fine ores have been obtained. Gold could be seen in this spur for 7 feet, where it ran into sandstone, completely altering the nature of the stone, the quality also changing. We, however, shall be soon through this sandstone and into slate again. No. 1 engine-shaft east, 175 feet of pumps, have already been placed in the shaft, and the column will be completed to-morrow."

AUSTRALIAN UNITED (Gold).—Mr. Kitto, Dec. 4: The loss of the Royal Mail steamship Rangoon, at Galle, with the whole of the European mails for Australia, has of course kept us without our usual letters. Operations have been recommenced at the Central Mine, where we had to drop a new lift in consequence of the influx of sand choking the plunger. The water which rose 150 ft. is now within 90 feet of the bottom. On an adjoining claim good results are being obtained. A dispute with Mr. Ellis as to charges for use of his land prevents my getting the accounts settled pending the arrangement of said dispute. The charges of sheriffs, lawyers, bank, and other interest will, I fear, reduce the balance for making the Central to 1200*l.* or 1300*l.*; however, this sum will be ample to test that property.

## FOREIGN MINES.

DON PEDRO NORTH DEL REY (Gold).—Telegram from Lisbon: Produce weighed to Dec. 13, 676 ozs.; estimate for month, 9500 ozs.

PACIFIC.—H. Prideaux, Dec. 27: During the past week we have raised from the mine about 25 tons of ore, and shipped from the mine to the mill 5 tons 11 cwts. 60 lbs. The estimated value of this ore is 3 tons 1 cwt. 23 lbs.—$125 per ton; 2 tons 10 cwts. 27 lbs.—$80 per ton. We have had a very severe storm, which has caused delay in shipping the ore to the mill. We have also had a short stoppage at the mine, owing to one of the engines getting out of repair, and putting some new tubes into the boilers. The ore is again being shipped to the mill, and the mine is working as usual. There is nothing new in the mine to report upon, the stopes and levels continuing much the same. The ore that is being raised is of a very fair quality. We are opening out some new stopes below the 400 ft. level, from which we shall commence extracting ore as soon as possible. There is yet at the mine a very large quantity of ore ready for the mill.—Also the following report, dated Jan. 2:—During the past week we have raised from the mine about 25 tons of ore. The ledges that produced this ore are—Buel North Star, 12 tons; Courtenay ledge, 7 tons; Batter's ledge, 6 tons. We have also sent to the Mettacom Mill from the mine 19 tons 18 cwts. 86 lbs. The estimated value of this ore is 10 tons, at $100 per ton; 9 tons 18 cwts. 86 lbs., at $80 per ton.; besides this there has been 14 tons of custom ore hauled to the mill. The Buel North Star ledge, in the bottom of the 400 ft. level, is 16 in. wide, and yielding good ore. The ledge in the back of the 55 ft. level, west of the sump-winze, is 12 in. wide, and contains some rich ore. The stopes that are being worked on tribute are without any particular alteration. The north cross cut, in the 550 ft. level, is progressing favourably; we hope to intersect the ledge in this cross-cut in about three weeks from this time.

— Telegram from the Superintendent at Lander Hill: Silver produced past week, $1000.

ECLIPSE (Gold).—Henry Tregellas, Dec. 12: Since last writing we have again cleaned up, after stamping (say) 150 tons from the big heap of quartz at the dump; in taking this quartz we had to take the worst part first, as in tipping it over a precipice of 100 ft. high the large and consequently the poorest correct. The yield in free gold is about $1650; not one shillings' worth has been taken from the blankets or strakes on account of breaking the gear wheel that drives the pans. The mill is working to satisfaction, but cannot be supplied with quartz by teams. We have not averaged 20 stamps constantly running.—Mine: Haymen's shaft is sunk 25 ft. below the 30 ft. level; lode 6 ft. wide, of good milling rock. The lode in the 300 has improved since last report. The stopes above this level have been suspended for the present; the miners therein engaged are making an incline tramroad down over the mountain, the road around the said mountain being entirely graded.—Tramroad: This road is graded to within 1200 ft. of the foot of the mountain, but we have not been able to run cars over the last 2000 ft. on account of a high embankment; this will be finished in two or three days, and then we will keep the mill fully supplied. You may imagine the difficulty I have had in supplying the mill, when I tell you that even now while I write two of the wagons are disabled by breaking their wheels, and I fear we shall be bothered more or less till we get rid of all teamsters altogether.—General Remarks: The smelting furnace is nearly completed, and the roasting furnace progressing. The chimney stack was not worked on after my writing you last till to-day. Our water supply is ample. I hope my next will be more satisfactory with regard to the yield of gold.

BIRDSEYE CREEK (Gold).—J. A. Stone, Dec. 26: We have had a very heavy storm, and I have been on the ditch myself with a good many men, and by so doing have prevented the ditch from breaking. Being new it is much more liable to break. Nearly all the ditches in this vicinity have been broken by the storm. If I had not run very little water, and kept a sufficient number of men employed during the storm the ditch would have been greatly damaged. There will be no lack of water before next summer. I am running Uncle Sam, Neece and West, and Brown's Hill; just got them started, and expect to make some good runs. Last week the progress in Neece and West tunnel was better; it was driven 9 ft. The work is gradually getting better.

UTAH (Silver).—The directors have received advices from their resident secretary, P. A. Eagle, up to Jan. 3. At that date they were anxiously expecting the advent of the new manager, Mr. Murphy (who has since taken possession). Mr. Eagle writes—"Under able management, and with sufficient working capital to effectually open up the mines, I am hopeful that the new year will witness an improvement in your property; and as you think of making a change in the management perhaps you could not do better than employ Mr. Murphy, who has the reputation of being a good smelter. We have plenty of cord wood, iron ore, and rock, and the furnaces are both completed ready for running. All we require is coal, as the large furnace will consume, we calculate, about 1000 bushels per day. Coal is coming in slowly, so that we cannot recommence just at present. Above 450 tons of ore are in hand, a portion of which has been roasted. The last assay, a week ago, from the "Red Warrior" gave silver $25, and lead 50 per cent. We shall get coal again as soon as the roads are passable, and I have made arrangements to haul it from Vandy to the works as soon as it reaches that place. We have two men mining at Canoblas, and the iron mine is said to be looking first-rate. We have almost suspended working the mines here until Mr. Murphy arrives. A short time since Capt. Rawlings let a contract for a further extension of the main tunnel; this is now extended about 470 ft., and I am pleased to say that the ground is improving in its character, and that there are some promising indications of ore. The costs for December are enclosed herewith.

PINTO (Silver).—Capt. Plater, Dec. 22: The company's mines are looking better than when I took charge or at any time since; not that any large quantity of ore has been developed in any particular place, but the general appearance and character of the ore improves as we get deeper, both in quality and purity, being free to a greater extent of lead and rebellious metals, which make treating it somewhat difficult. The tunnel is now in 510 feet, and the face very hard, which indication at this point I regard as most favourable.

— Telegram received (Jan. 24) from the superintendent: "I have shipped up to date silver bars valued at about 200*l.* More follows."

NERBUDDA COAL AND IRON COMPANY.—Branch Line: Under date Dec. 20 the agent writes—We are working hard to get an engine through to Mopani by Jan. 1—a distance of about 11 miles. By telegram the directors are informed that the branch line was opened on Jan. 1.

KANSAS.—The directors have received the following report:—In the main shaft the ground sunk through during the past fortnight (7 ft.) has turned out exceedingly well; lode now 2½ ft. wide, producing good smelting ore—a splendid looking lode. At the 140 ft. level, west of main shaft, we have turned attention to the north part; if it proves as good as it promises we shall sink for 200 ft., when ground can be opened out to advantage. I am pleased to inform you the bottom of the mine (the part we looked for permanency) is everything that can be desired, and should the lode continue to hold down as good as at present, and a level driven at the 200 ft., a splendid mine will be laid open. Gold sold for December, $7094 72 c.; cost for December, $4672 33 c.: profit, $2422 39 c.

IMPERIAL OTTOMAN.—J. B. Champion, Jan. 9: I am pleased to say No. 3 lode continues to produce a fair quantity of lead. We are driving the level 9 ft. wide, which is composed of lead, blende, spots of copper, and hard elvan, and will yield from 1½ to 2 tons of lead ore per cubic fathom. In driving south on the same lode we find stones and branches of lead in the gossan, also boulders of limestone, which materially disorder the lode, and retard the driving; but in continuing this end I anticipate more settled ground, when a more favourable change may be expected. We have driven the bottom crosscut 12½ fms. from the engine-shaft; 7 fms. from the shaft we intersected what we considered from the kindly appearance a lode from 3 to 4 ft. wide, producing lead throughout; but in opening out north and south it became small and unproductive. In extending the cross-cut 5 fms. farther we cut a branch of gossan producing fine lead, very similar to the lode at No. 1 level. I have put the men to drive on this branch north and south, being of opinion we shall soon meet with some important change. The stratum is of an elvan formation, intermixed with gossan and quartz, and highly mineralised. There is nothing particular to remark on Champion lode; we are obliged to suspend the working for the present, in consequence of too much water, caused by the heavy fall of snow and rain. Our dressing department is in full working order dressing ore. We have 20 tons of lead at Touzla, waiting for an opportunity to ship it, and in 20 days I will send another parcel of 10 tons. The roads are in a very dilapidated state, causing great difficulties to get the ore to port; but I trust to keep the carriers fully employed with lead and blende. I beg to send an additional tracing, showing what work has been done since my last, which I hope will be satisfactory.

LINARES.—Jan. 17: Pozo Ancho: The lode is small and poor in the 85, west of Crosby's shaft. The ground is very hard, and the lode unproductive in the 75, west of Crosby's shaft. In the 75, west of San Francisco's shaft, the lode is of a kindly appearance, consisting of carbonate of lime and lead ore, yielding of the latter 1 ton per fathom. The lode in the 75, east of San Francisco shaft, is small, composed chiefly of quartz, with a little lead ore, worth ½ ton per fathom. In the 65, west of San Francisco shaft, the lode is disarranged and poor. The lode in the 55, west of San Francisco shaft, is very firm and compact, and looking kindly, yielding ¾ ton of ore per fathom. The lode is small and poor in the 45, east of San Francisco shaft.—Los Quinientos: The 65, east of Taylor's engine-shaft, is still unproductive. The 65, west of Taylor's engine-shaft, is without change to notice since last report. The 55, west of Taylor's engine-shaft, is opening up a good run of tribute ground, worth 1½ ton per fathom. The lode in the 55, east of Taylor's engine shaft, is large, yielding occasional stones of lead ore. In the 45, east of Addis's shaft, the lode is large and strong, producing fine lumps of lead, worth ½ ton per fathom. In the 32, east of Henty's shaft, the lode is compact and solid, and looking well, producing 5 tons of ore per fathom. The 32, west of San Carlos shaft, has fallen off a little in value since last reported, now yielding ½ ton per fathom. The lode in the 45, west of San Carlos shaft, has very much improved, yielding 1¼ ton per fathom. In the 55, west of San Carlos shaft, the lode is regular and well defined, consisting of carbonate of lime and lead ore. In the 55, east of San Carlos shaft, there is a strong, powerful lode, composed chiefly of quartz and lead ore, yielding of the latter 1 ton per fathom. Up to Wednesday last the 45, east of San Carlos shaft, looked well, when to our surprise and disappointment it struck into old works. The lode in the 32, east of San Carlos shaft, is disarranged, and is now unproductive.—Shafts and Winzes: Salvador's winze, below the 32, yields a little lead, but not enough to value. In Peres' winze, below the 32, the ground is hard for sinking, and the lode unproductive. Garcia's winze, below the 45, is a new winze commenced below the 45, west of Taylor's engine-shaft, and in advance of the 55 fm. level end.

FORTUNA.—Jan. 17: Canada Incosa: In the 110, west of Henty's shaft, the lode fell off a little last week, but has again improved, and now carries a good deal of friable quartz, worth 2 tons of ore per fathom. The lode in the 100, west of Henty's shaft, has improved in size and value, yielding 2½ tons of ore per fathom. The lode in the 80, south of Henty's shaft, is of no value. In the 60, east of San Pedro's shaft, the men are stoping the bottom, preparatory to resuming the driving of the end. In the 90, east of Addis's shaft, the lode is split into small and unproductive branches. There is a good lode in the bottom of the 80, west of Lowndes' shaft, worth 1 ton per fathom. The lode in the 80, east of Caro's shaft, is disarranged and unproductive.—Shafts and Winzes: The men are getting on at a slow rate with Judd's shaft, below the 90. The plunger-lift will soon be completed at Lowndes' shaft, below the 80. In Serrano's shaft, below the 70, the lode has greatly diminished in value since last report, and is now producing ½ ton of ore per fathom.—Los Salidos: The lode in the 110, west of Buenos Amigos engine-shaft, is firm and solid in the upper half, but the bottom is poor, producing 1 ton of ore per fathom. There has been a great improvement in the 100, west of San Carlos shaft, since last report, but it is now small again, producing ½ ton of ore per fathom. The lode in the 90, west of San Carlos shaft, is small, and quite unproductive. There is no improvement in the 75, west of San Carlos shaft. The 110, east of San Carlos shaft, is still a large and promising lode, but not so productive as it was a short time since, and yielding 1¼ ton of ore per fathom. The lode in the 110, east of Morris's shaft, is looking better than we have seen it for a very long time past, producing ½ ton of ore per fathom. The lode in the 100, east of San Pablos shaft, is very compact and solid, and opening a splendid run of ore ground, worth 3 tons per fathom. In the 90, east of San Miguel's shaft, the lode is large, consisting chiefly of quartz, carbonate of lime, granite, and lead ore, yielding of the latter 2¼ tons per fm. In the 25, west of Palgrave's shaft, a stope is being carried on below old works, to make good the bottom of the level, yielding 1½ ton of ore per fathom. The lode in the 35, west of Palgrave's shaft, is split into several branches, containing a little lead, and letting out much water, producing ½ ton of ore per fathom. In the 35, east of Palgrave's shaft, the ground is hard, wet, and troublesome for driving, yielding ½ ton of ore per fathom.—Shafts and Winzes: There are good stones of ore in the western end of Jordan's winze, below the 100, yielding ½ ton of ore per fathom. The lode at present in Agurtin's winze, below the 90, is small, yielding ½ ton of ore per fathom. The lode in Medina's winze, below the 25, is split into several small branches, producing ¾ ton of ore per fathom. The tribute department yielded very well in the past month, and the stopes are now without any alteration worthy of notice. The surface works are being carried on very regularly, and the machinery in both mines is in good working condition. We estimate the raisings for January at 350 tons.

ALAMILLOS.—Jan. 17: The lode in the 60 fm. level, west of San Rafael's shaft, is small, and does not contain sufficient lead to value. There is no change to speak of in the 50, east of La Magdalena shaft. The lode in the 75, east of Taylor's engine-shaft, is quite unproductive. In the 85, east of Taylor's engine-shaft, the lode yields some good stones of ore, worth ½ ton per fm. In the 85, west of Taylor's engine-shaft, the lode is large and strong, and of a promising appearance, yielding ½ ton of ore per fathom. The lode in the 75, west of San Adriano cross-cut, is somewhat larger, but quite unproductive. In the 50, west of San Yago shaft, the lode produces occasional stones of ore. The lode in the 40, east of San Victor shaft, has improved both in size and value,

lay at the foot of the heap, and our next clean up will prove my assertion to be and is of a very kindly appearance, yielding 1 ton of ore per fathom. The driving of the 50, east of San Victor shaft, was commenced a few days back; the lode is small and compact. The lode in the 40, west of San Victor cross-cut, has fallen off in value within the past few days, and hardly contains enough lead to value. The 50 cross-cut, south of San Victor shaft, is much the same as when last reported on. In the 20, east of Addis's shaft, the men are still cutting in north to prove the other part of the lode. The lode in the 40 fathom level, east of Crosby's shaft, is well defined, and letting out water freely, yielding 1¼ ton of ore per fathom. The lode in the 55 fathom level, east of Crosby's shaft, maintains its size, but has fallen off in value, producing ½ ton of ore per fathom. The 40, west of Crosby's cross-cut, continues much the same as for some time past, opening out good tribute ground, worth 1½ ton of ore per fathom. The lode in the 50, east of Crosby's cross-cut, has been very productive for the past fortnight, but is not so good at present, yielding 1½ ton of ore per fm. The 50, west of Crosby's cross-cut, is opening out a long length of very good tribute ground, it being rather easy for driving, yielding 2 tons of ore per fathom.—Winzes: Rica's winze, below the 30, is going down through a splendid course of ore, worth 4 tons per fm. Felipe's winze, below the 30, having reached the required depth for a 40, the men are put to drive to meet the level coming up from San Victor, producing 1½ ton of ore per fm. The lode is compact and very regular in Sebastian's winze, below the 40, yielding 1 ton of ore per fathom. Lazaro's winze, below the 40, is being sunk about 10 fms. to the west of Crosby's cross-cut, yielding 2 tons of ore per fathom.

RHINE.—Jan. 22: Schmelzer: We are making steady progress in driving the cross-cut at the 27, north of Henty's shaft. The ground continues hard and unfavourable for driving. No indication of the Schmelzer north lode, which should be very near, is yet to be seen. The cross-cut to the Toni lode, near Henty's shaft, has passed through the lode, and is being driven a little beyond it, to see if any further portion exists on the banging-wall previous to driving on the lode. The lode is of the same character as in the shaft, which is only 2 or 3 fms. from the point of intersection. We hope to commence proving the lode in a south-westerly direction in a few days.

[For remainder of Foreign Mines see to-day's Journal.]

## THE ECLIPSE GOLD MINING COMPANY.

Superintendent Tregellas, of the Eclipse Company, is just beginning to get the new mill and things connected with the mine, generally, in working order. In his endeavours to accomplish this end, and obtain results sufficiently tangible and satisfactory to meet the expectations of anxious stockholders, Captain Tregellas has had many embarrassing obstacles to contend against. His obvious progress and success in the face of these difficulties can be no less encouraging and gratifying to the company he represents than to himself.

THE MINE.—The saving clause, perhaps, against all the discouragements, consists in the fact that the mine itself has ever presented the most encouraging aspect. For months past an immense body of ore, gold, and argentiferous galena has been uncovered in amount without further developments to insure an abundant supply for an indefinite number of years. No doubts have been, or need be, entertained on this point, nor of its value. The only question was as to the method and appliances to be used in saving the gold. In moderately pure gold ores, carrying little or no base metal, this is comparatively a simple matter, but in the ore from this mine there is a heavy percentage of base minerals, rendering its successful reduction a matter of scientific manipulation. We are told, and do not doubt the statement, that the whole of this ore together has an assay value of not less than $25 per ton. Of some being put through the batteries we observed during a recent visit considerable quantities that would certainly range into the hundreds, though much the larger portion was of low grade, and some, again, presenting to the eye no indication of value whatever. Everything contained in the 7-ft. ledge goes to the stamps unassorted.

The tramroad is now completed to a point within 2000 ft. of the lower dump. A large force, mostly Piutes, are engaged on the tramroad, and in a few days will have it finished, so that the teams now employed in carrying the ore from the dump to the cars can be dispensed with, thereby effecting a saving of $1·75 on the transportation of each ton of ore, besides the extra handling. Measures are in course of execution to procure a light locomotive for use on the tramroad, which was constructed with that object in view. There is no question but what the substitution of a locomotive in lieu of the horses now used as a motive-power for the cars will be not only more economical in the first instance, but a great deal more effective generally. When this is done, and some improvements effected about the dump, the whole cost of mining, transportation, and reduction need not exceed $5 per ton. Fourteen cars and four horses are now engaged in transporting the ore at the rate of about 28 tons per day. This amount does not equal the capacity of the mill, so that it will have to be shut down occasionally for want of ore.

Thirty stamps of the usual style are set up and running, and twenty more soon to be in place. The mill is under the charge of Mr. John Morris, assayer and amalgamator, who seems to be well qualified for the responsible duties of his position. Much depends on his knowledge and judgment in the use of chemicals and the extensive appliances necessary for the amalgamation of gold accompanied by so much base metal. As he has already accomplished results that assures a most flattering success for the whole enterprise, we conclude he is the right man in the right place.

The appliances for saving the gold have been previously described in our description of the old mill, but as some important additions are to be made to the apparatus, we shall take a brief view of the present and intended process together. The pulp first passes through a No. 70 wire-screen, then over copper plates into a vibrating table divided into four compartments, each of which contains about a tank of quicksilver. Were there no chemical reasons to prevent, every particle of gold would be amalgamated before going further, but as it is much of it passes on to the blanket sluice or "strakes," which come next in order, and at present ends the process of amalgamating. As soon as possible, however, Capt. Tregellas intends to add other machinery, the first being what is technically called a

BUDDLE.—This is a machine extensively used in tin mining in England and in the gold mines of this State, particularly in Grass Valley. The object of its use is simply to reduce the tailings for the usual pan grinding to a minimum quantity—say, to 5 per cent. of the whole. This is done by concentration, effected by the specific gravity of the gold contained in the tailings, somewhat as the gold is saved by sluice boxes in placer mining. The buddle is a shallow pan, 18 ft. in diameter, with a wooden bottom. In the centre of this bottom, and cutting through it, is a cast-iron drum, standing on end, and about 30 inches in height and diameter. The bottom planks, where they join the drum, are 14 in. lower than at their outer ends, thus making a sort of a wide funnel. Vertically through the centre of the drum is a shaft, from which a number of arms or iron troughs radiate, reaching to the rim of the buddle. The pulp is received at the centre, and, passing along these arms, which are slowly moving around, is deposited on the outer and high end of the bottom planks, where the heavier portion is retained by its own gravity, while the lighter and least valuable part is by the action of water moved towards the drum in the centre, against the sides of which all of any special value lodges, and the lighter particles pass over the edge of the drum and down through into a reservoir below, where they are deposited for future consideration. The drum can be raised and depressed by machinery. At the beginning of the process its upper edge is but an inch or two above the lowest part of the floor, and is designed to retain the same relative position to the surface of the inflowing pulp until the latter fills the buddle. The whole operation is automatically effected by machinery capable of the nicest adjustment, the whole arrangement needing but little attention. The buddle, when full, will contain 50 tons, which has yet to be subjected to the final pan grinding.

A WILLOW-LINED MILL RACE.—In addition to many other contemplated improvements, the long mill race is to be lined with growing willows to protect its banks, and thereby increase its capacity. This sensible improvement will add one redeeming feature appreciable to the eye accustomed to gaze upon the desolate expanse through which the race has been constructed.

Steam hoisting works will during next week be put in place at the mine, and then as soon as the dump and tramroad connections are completed there will be no trouble in delivering ore enough to keep 100 stamps constantly in motion.

Fifty additional stamps will be put in the mill as soon as the arrangements for delivering a sufficient quantity of ore are completed. The wheel now in use has a surplus power amply sufficient to drive the additional 50 stamps, or 100 in all. Considerable quantities of rich smelting ores are extracted from the mine, for the reduction of which

A smelting-furnace is in course of erection, and will soon be in running order. When finished, the works of the Eclipse Mining Company will be the largest and most complete in necessary adjuncts of any in the county, and, so far as our knowledge extends, in the State. The work has been undertaken by this company as a legitimate enterprise, the profits being wholly contingent upon the money extracted from the mine itself; in other words, it is not a stock-jobbing operation, nor is the property for sale. For these reasons we heartily wish it a magnificent success, and confidently believe that it is and will continue to be. The administration of the company's affairs is in good hands. Superintendent Tregellas has the knowledge and experience to fit him for his responsible duties, and the judgment and energy to execute them, and he does it.—*Independent* Inyo County, California, Dec. 16.

UTAH.—The *Salt Lake Herald*, of Dec. 20, says:—"We had a pleasant call yesterday from Mr. Philip A. Eagle, resident secretary of the Utah Silver Mining Company, whose works are located in Bingham canon. Mr. Eagle informs us that the company are at present successfully working their mine, taking out large quantities of ore, but the smelting-works are idle through lack of charcoal, this is a deficiency which will doubtless be soon supplied, although the present stormy weather may seriously interfere with coal burning."

CAMP FLOYD.—The *Salt Lake Herald* of Dec. 31 states that, from a gentleman just in from Camp Floyd, we learn that the Camp Floyd Company of London, located in the Camp Floyd district of Captain E. H. Shaw, and who are represented here by that gentleman, are making good progress in developing their purchase. A large force of men are engaged opening the mine at four different points, all of which show good milling ore. The company have just completed a ditch for the reception of pipes to convey water from their spring to the works, a distance of 2½ miles. They have erected a fine office in Lewiston for the transaction of their business, which would reflect credit on any city. The machinery for the mill and the water-pipe is being manufactured in San Francisco, and Captain Shaw intends to leave for that city this week, to superintend its shipment. Captain E. B. Wilder, a gentleman of large experience in mining matters and a first-class mining engineer, has charge of these works as superintendent. Capt. Shaw is shipping forty sacks of ore from the Sparrow Hawk Mine (which belongs to the Camp Floyd Co.) to Europe as it came from the mine, that the same may be thoroughly tested there. The ore came in last night by Chislett's stage, and is now at Wells, Fargo's office.

SUPPLYING FUEL TO FURNACES.—The invention of Mr. SAMUEL DANES, of Cincinnati, U.S., relates to supplying coal to a furnace or grate requiring a high temperature, by means of one or more revolving augers, in such a manner that, first, the combustion of coal so fed is far more perfect than when the coal is fed in the ordinary way, and by this more perfect combustion, heat is economised. Second, slack or fine coal, as well as coarser coal, may be fed to the furnace, and with equally good results. Third, a continuous supply of coal may be kept up. Fourth, much labour is saved in putting the coal into the grate. In these respects the said invention is greatly superior to the methods of firing furnaces and fireplaces now in use.


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PATENTEES AND MAKERS OF DOUBLE AND SINGLE-ACTING STEAM HAMMERS of all sizes, from 17 lbs. to 20 tons, with Self-acting or Hand Motions, in either case giving a perfectly DEAD-BLOW, while the former may be worked by hand when desired. Large Hammers, with Improved Framing, in Cast or Wrought Iron. Small Hammers working up to 500 blows per minute, in some cases being worked by the foot of the smith, and not requiring any separate driver.

SPECIAL STEAM STAMPS, of great importance for Smith Work, Bolt-making, Punching, Bending, &c.

Hammers for Engineers, Machinists, Shipbuilders, Steel Tilters, Millwrights, Coppersmiths, Railway Carriage and Wagon Builders, Colliery Proprietors, Ship Smiths, Bolt Makers, Cutlers, File Makers, Spindle and Flyer Makers, Spade Makers, Locomotive and other Wheel Makers, &c.; also for use in Repairing Smithies of Mills and Works of all kinds, for Straightening Bars, Bending Cranks, Breaking Pig-iron, &c.

STEAM HAMMERS AND STEAM STAMPS MAY ALWAYS BE SEEN AT WORK.

# THE DON ECONOMIC LUBRICATING OIL

## IS 40 PER CENT. CHEAPER THAN THE ORDINARY KINDS.

ECONOMIC LUBRICATING — THE DON — OIL.

MR. ALFRED HEWLETT, of the Wigan Coal and Iron Company, says:—"I have used it for two years, and find it to answer exceedingly well for lubricating purposes."

MR. NASMYTH, the Inventor of the Steam-Hammer, says:—"I am highly pleased with it as a most effective and durable lubricant, having remarkable properties in the way of setting free bearings which had got set fast."

In face of these and hundreds of other letters to the same effect, it is a MERE WASTE OF MONEY to use the dearer kinds for the engines and machinery of collieries and mines, numbers of which are now using the Don Oil instead.

Any company desirous of trying it before adopting it may do so at our risk and expense.

Circulars containing particulars sent on application.

PRICE—By the Ton of 253 Gallons, 2s. 6d. a gallon; by the Cask of 40 Gallons, 2s. 9d.

AGENTS WANTED AT HOME AND ABROAD.

## DUNCAN BROTHERS,

MANAGERS,
DON OIL COMPANY, 2, BLOMFIELD STREET, LONDON, E.C.

# CHAS. PRICE AND CO.'S RANGOON ENGINE OIL,

## AS SUPPLIED TO H.M. DOCKYARDS AND FLEET.

THIS OIL is suitable to every kind of Machinery. As a lubricant it is equal to the best Sperm or Lard Oil, while it possesses the great advantage of being entirely free from any principle which will corrode the metal bearings.

For particular kinds of Machinery, the Oil may be specially prepared of a consistency and character adapted to the nature of the work to be done.

"Chemical Laboratory, 7, Printing House-square, Blackfriars, April, 1869.

"I herewith certify that the Rangoon Engine Oil, manufactured by Messrs. Chas. Price and Co., is free from any material which can produce corrosion of the metal work of machinery. It is indeed calculated to protect metallic surfaces from oxidation.

"The lubricating power of this oil is equal to Sperm or Lard Oil.

"T. W. KEATES, F.C.S., &c. &c."

Every parcel of the Oil sent from the work bears the Trade Mark of the Firm.

LONDON: CASTLE BAYNARD, UPPER THAMES STREET.
WORKS: MILLWALL, POPLAR; and ERITH, KENT

PATENT

# SELF-LUBRICATIVE STEAM & HYDRAULIC ENGINE PACKING.

This Packing is invaluable to all Users of Steam-Power; it supersedes anything of the kind ever invented; it is now in use in all the Chief Railways and First Firms in this Country and Abroad, and is

THE ONLY PACKING THAT WORKS WITHOUT OIL OR GREASE,

Does not char, is pliable, keeps the rods

COOL, BRIGHT, AND CLEAN,

And lasts longer than any other, thereby

SAVING FULLY 200 PER CENT.

To the User, in oil, labour, and material.

Can be had only from the Agents throughout the country, appointed by

THE SOLE LICENSEES,

[FOR THE LUBRICATIVE PACKING COMPANY],

## HENRY HOUSE AND CO.,

## CATHERINE STREET, CITY ROAD, LONDON, E.C.

BY APPOINTMENT TO HER MOST FEARFUL GRACIOUS MAJESTY THE QUEEN.

# BOILER EXPLOSIONS AVOIDED BY USING PAYNE'S ANTI-CORROSIVE FLUID.

It is highly recommended by Engineers to Proprietors of Steam Boilers (Marine or Stationary) for PREVENTION and REMOVAL of INCRUSTATION. The price is 6s. per gallon. One gill per horse power per week will remove any incrustation from old boilers, and keep new perfect.

[CERTIFICATE.]

"19, *Staunton-terrace, Blue Anchor-road, S.E., March* 12, 1869.

"DEAR SIR,—I have minutely examined your Anti-Corrosive Preparation, and can state with confidence that in no way is it injurious to iron or brass. It is inodorous and perfectly harmless, even when swallowed. T. R. L. HOOPER, M.R.C.S.L.

"Mr. Payne."

ORDERS ADDRESSED TO

## PAYNE AND CO.,

## 33, CHERRY GARDEN STREET, BERMONDSEY, LONDON, S.E.

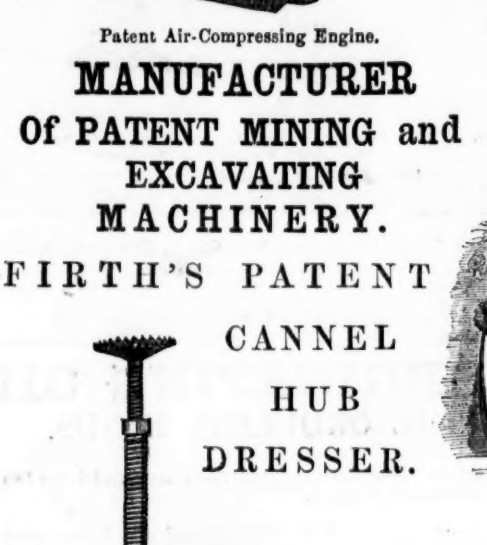
# F. HURD, ENGINEER,

## MILLWRIGHT, MACHINIST,

## BRASS AND IRON FOUNDER,

## ALBION FOUNDRY,

## WAKEFIELD.



Patent Air-Compressing Engine.

**MANUFACTURER**
**Of PATENT MINING and EXCAVATING MACHINERY.**

FIRTH'S PATENT CANNEL HUB DRESSER.

Patent High-speed Reversible Engine, without the aid of Tappets, Cams, or Eccentrics. Cylinders either fixed or oscillating.

**HYDRAULIC and AIR-COMPRESSING MACHINERY. Heavy, Light, and Ornamental CASTINGS, and Patent WORSTED MACHINERY.**

Patent Power, or Hand Straight Work Coal-Cutting Machine.



Patent Self-propelling Coal-cutter.

Patent Power Pillar-and-Stall Work Coal-Cutting Machine.

**Also, FIRTH'S PATENT ECONOMIC PERMANENT RAILWAY, without the aid of Pins, Bolts, or Wedges, that can be laid by an ordinary labourer with rapidity.**

GENERAL CONTRACTOR; and Estimates given for Air-Compressing Machinery and Coal-Cutting Machinery on application.

# PEPPER MILL BRASS FOUNDRY COMPANY,

## DARLINGTON STREET, WIGAN,

## COLLIERY FURNISHERS,

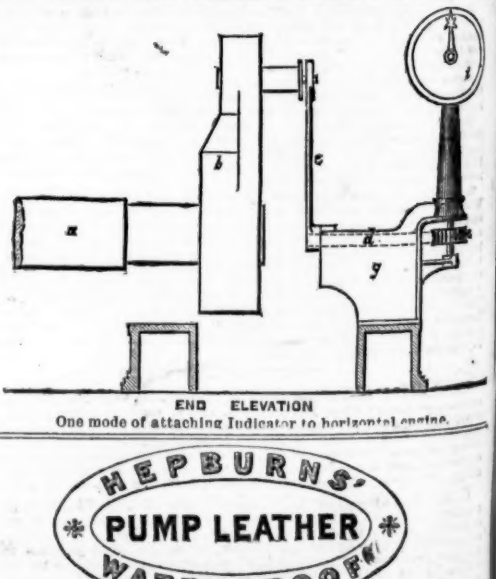
## BRASS FOUNDERS, COPPERSMITHS, & GAS METER MANUFACTURERS,

The PEPPER MILL BRASS FOUNDRY COMPANY beg respectfully to invite attention to their IMPROVED SELF-REGISTERING COLLIERY WINDING INDICATOR, which, in addition to its ordinary use of indicating the position of the load in the shaft, registers the number of windings, thus enabling the manager at a glance, and at any moment, to check the return of the banksman or tallyman, by reading off from the dial the number of windings for any stated time.

This Indicator is especially adapted for Water Winding or Pumping. Its indications cannot possibly be tampered with, and unerringly show the number of windings or strokes for any stated period, so that it will at once be seen whether or not the person in charge has been fully discharging his duty.

These Winding Indicators are supplied either with or without the Self-registration Dial.

The Pepper Mill Brass Foundry Company will be glad to furnish, on application, sets of drawings illustrative of the simplest and cheapest mode of attaching their indicators to engines of various constructions, either vertical or horizontal.



END ELEVATION

One mode of attaching Indicator to horizontal engine.

# HARDING S FLEXIBLE ROOFING,

**The Best and Cheapest Covering for Houses, Sheds, Summer-houses, Verandahs, Farm and other Buildings, &c.**

Suitable for all climates, and adopted by the English and Foreign Governments, Railway Companies, Metropolitan Board of Works, &c. Used at the Woolwich Arsenal, Chatham, Haulbowline, Malta, Deptford, and other Dockyards. Awarded the FIRST PRIZE SILVER MEDAL, International Exhibition, 1869, for its cheapness and superiority to Asphalte Roofing Felt, although the price was then 50 per cent. higher than at present, and is proved to be a much more durable, efficient, and weather-tight roofing than Corrugated Iron, at one-third the cost, and can be most easily fixed by any unpractised person.

## ONE PENNY PER SQUARE FOOT.

Or 23s. per roll of 25 yards long, by 44 inches wide.

Each roll containing 276 square feet. Made any width and length to order, and especially manufactured for the Tropics. Dressing 2s. 6d. per gallon; zinc nails, 5d. per lb.; 1¼ gallons dressing and 3½ lbs. zinc nails required for each roll of roofing. Directions for fitting sent with every roll. Delivered free on rail or boat in London. Samples on application.

Report on the merits of HARDING'S FLEXIBLE ROOFING after its exclusive adoption at the Woolwich Arsenal, Chatham, Haulbowline, Deptford, and Malta Dockyards for the last six years:—

No. 296.

"SIR,—In reply to your letter of the 20th ultimo, asking for a report on the merits of your Flexible Roofing, I have to inform you that where it has been used it has so far satisfactorily answered the purposes for which it was required. I am, Sir, your obedient servant,

ANDREW CLARKE,

"Mr. James Harding, 20, Nicholas-lane, Cannon-street, E.C." Lieut.-Col. R.I. Eng., Director of Architectural and Engineering Works, Admiralty.

"*Admiralty, Spring-garden-terrace, S.W., April 4, 1871.*

**JAMES HARDING, SOLE MANUFACTURER, 20, NICHOLAS LANE, CANNON STREET, LONDON, E.C.**

Depôts—Paris: 12, Boulevard Poissonnière. Hamburg: 57, Rödingsmarkt.

Agents—Dresden: Hugo Schubert and Co. Amsterdam: Perry and Co. Liverpool: Messrs. Archibald Wallace and Co., Royal Insurance-buildings, North John-street. Birmingham: Messrs. Taylor and Cook, 25, Union-street.

HEPBURNS'
PUMP LEATHER
WATERPROOF

By a special method of preparation, this leather is made solid, perfectly even in texture, and impermeable to water; it has, therefore, all the qualifications essential for pump buckets, and is the most durable material of which they can be made. It may be had of all dealers in leather, and of

**I. AND T. HEPBURN AND SONS,**

TANNERS AND CURRIERS, LEATHER MILLBAND AND HOSE PIPE MANUFACTURERS,

LONG LANE, SOUTHWARK, LONDON.

Prize Medals, 1851, 1855, 1862, for

MILL BANDS, HOSE, AND LEATHER FOR MACHINERY PURPOSES

THE IRON AND COAL TRADES' REVIEW:

ROYAL EXCHANGE, MIDDLESBOROUGH.

The IRON AND COAL TRADES' REVIEW is extensively circulated amongst the Iron Producers, Manufacturers, and Consumers, Coalowners, &c., in all the Iron and coal districts. It is, therefore, one of the leading organs for advertising every description of Iron Manufactures, Machinery, New Inventions, and Metal Trade matters relating to the Iron, Coal, Hardware, Engineering, and Metal Trades in general.

Offices of the Review:—Middlesborough-on-Tees (Royal Exchange); London, 11 and 12, Red Lion-court, Fleet-street; Newcastle-on-Tyne (50, Grey-street).

London: Printed by RICHARD MIDDLETON, and published by HENRY ENGLISH (the proprietors), at their office, 26, FLEET STREET, E.C., where all communications are requested to be addressed, and not to the Editor.

# SUPPLEMENT.

# THE MINING JOURNAL,

## Railway and Commercial Gazette.

**FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.**

## EXTRACTS FROM DICKER'S "AUSTRALIAN & LONDON GAZETTE."

LONDON, SATURDAY, JANUARY 27, 1872.

### GOLD AND THE GOLD-FIELDS.

—o—

ALTHOUGH the past month has been somewhat barren of special or startling incidents in connection with the gold-mining industry of the colony, and the time has been a dull one for those who are simply speculators in mining shares, the general result of the working operations of practical miners over the whole colony has been exceedingly satisfactory. There are no means in the colony by which the exact amount of gold obtained in it from week to week can be ascertained, and though the mining registrars and surveyors of the Government endeavour by seeking information from gold buyers, mining companies, and others, to form an estimate of the yields in each of their districts, their returns are necessarily very incomplete, as they cannot possibly obtain accounts from many of the subdivisions of their districts, or rely with certainty on such yields as may be given to them. The Custom-house returns of the amount of Victorian gold exported, which are published weekly, however, furnish a very close approximation of the yield of gold in the colony as a whole, and during the whole course of this year they have shown a gradual and at the same time very important increase in the quantity of gold exported, as compared with corresponding portions of the previous year. There is now no export duty on gold, and as it is an article which it would not pay any one to retain with the view of making a larger profit upon, there is no doubt that it is sold at the earliest opportunity by those who obtain it, and afterwards exported through the Customs by the buyers at the first favourable opportunity which presents itself. The Customs returns must therefore be taken as a tolerably correct record of the yield of the colony, and according to them the amount of Victorian gold exported up to November 25 of this year was 182,618 oz. in excess of what was exported up to the corresponding period of 1870. The exact quantity exported to the date named in 1870 was 1,122,546 oz., and to the same time in 1871 it was 1,305,164 oz., or an increase at the rate of 16 per cent. These figures are especially gratifying when it is remembered that up to a very recent period it was predicted by some persons, thought to be well acquainted with the auriferous resources of the colony, that the gold-mining interest was in such a rapid state of decadence that very soon the yield of gold would all but cease. These gloomy views were adopted by many others whose personal experience did not enable them to form an accurate judgment of their own; but notwithstanding the tenacity with which desponding opinions are held by those naturally prone to form them, our gold-fields, during the last twelve months especially, have exhibited such undeniable proofs of richness and permanency, that there are now no believers in the decaying or "running-out" theory of the yield of gold.

On the contrary, the gold-mining industry never, since the first discovery of gold here, showed such signs of being a lasting occupation for the working classes. Gradually, though surely, for some years past, the operations of the quartz-miner have been extending over all the districts in the colony, until now the yields from quartz exceed those from the alluvial diggings of the colony. As time progresses, too, it appears that quartz reefs are almost inexhaustible. They may be worked for many years without giving out, and so far it has not been ascertained that there is any bounds to the depths at which they are payable. Fresh discoveries of these reefs are constantly being made in all parts of the colony, and the greatest exertions are being put forward to find others in localities where it is presumed they may be found. Prospecting for their discovery is being carried on most vigorously, especially in the Sandhurst district, where many different companies have claims yielding very profitably. There have been so many new companies formed there to explore new ground that the district is certain to be subjected to a very fair trial of its capabilities. The rush or mania for speculating in Sandhurst mining shares, which was noticed in last month's summary, died away during the earlier part of this month. It is thought by some, however, that there will speedily be another reaction respecting the mines in that district, and that the market values of their shares will, ere long, equal, if they do not exceed, the speculative prices which were quoted at the height of the recent excitement respecting them. There is one other matter well worthy of mention concerning quartz-mining, namely, that the statistics of the colony prove it to be far more profitable than alluvial gold-mining is. The return of gold per head of the persons engaged in it is far above the return received from those working in the alluvial branch of the industry, and the wages of quartz-miners are considerably in excess of those paid to diggers engaged in alluvial pursuits. Another satisfactory feature of the statistics of the colony is the fact that although, according to them, the number of miners at work on the gold-diggings decreases every year through many of the diggers settling on the agricultural lands of the colony, or adopting other pursuits which they find more congenial or profitable, the actual yield of gold goes on increasing largely. The certain result of this fact is that gold-mining must be much more profitable now than it has been for many years to those who are occupied in it, and the extra benefits derived by them must be participated in to a proportionate extent by the inhabitants of the colony generally.

A "monster" cake of gold, the result of a fortnight's crushing of the Great Extended Hustler's Tribute Quartz Mining Company, Sandhurst, was exhibited in the window of a jeweller's shop, Melbourne, during the past week, and attracted considerable attention. It weighed no less than 2564 oz., was worth over 10,000*l*., and was said to be the largest cake ever obtained by any company. It certainly was the richest cake ever seen.

Within the last few days the Richard Heales Quartz Mining Company, Sandhurst, are stated to have found the cap of the same reef from which the Golden Fleece Company, their next neighbours on the Stafford line of reef, have been for some weeks obtaining splendid yields. The history of the Richard Heales shares has been a chequered one lately. About two months ago they could be bought for a few shillings each, and then as the splendid prospects of the Golden Fleece Company presented themselves, they speedily rose in value, until they reached 38*s*. or 40*s*. each, on the assumption that the Company would soon cut the same stone as the Fleece Company were obtaining. Several weeks, however, passed, and the stone was not cut, which caused a reaction in the appreciation of the shares, and they receded until a day or two ago, when they were offered as low as 12*s*. or 13*s*. each, with nobody willing to take them at that price. Immediately, however, that it was rumoured they had struck the cap of the reef they were in search of, the shares rose rapidly in value, and in three days they could not be bought for less than 35*s*.—their present quoted price in a rising market. The improved prospects of this Company have also increased the value of the shares of other companies in its neighbourhood, and of Sandhurst stocks generally.

The Ovens district appears to be contributing its quota towards the generally increased yield of gold. The *Ovens Advertiser* publishes the following paragraph:—"The local gold escort started for Melbourne on the 15th November with 15,412 oz. 17 dwt. 18 gr. of gold, being the amount obtained in the previous seven weeks. We are happy to see that this shows a steady increase in the yield of this district, the previous seven weeks having only resulted in 13,270 oz. 4 dwt., and the same period before that only 10,040 oz. 19 dwt." The same paper also writes as follows of quartz mining in the district:—"We have not the slightest doubt that before long an immense impetus will be given to the working and prospecting of quartz reefs in this district. There are many indications of it already, and when the reaction really sets in, it will come 'with a rush.' Here is one slight instance, just come to hand, of the richness of some of our reefs:—A handsome yield of 132 oz. of gold was got from 30 tons of stone, taken by Messrs. Osborne & Co., from the Champion Reef, Harrietville, this week."

(*Continued on page* 4.)

## EXTRACTS FROM DICKER'S AUSTRALIAN AND LONDON GAZETTE.

# THE MINING JOURNAL, RAILWAY AND COMMERCIAL GAZETTE.

*SATURDAY, JANUARY 26th, 1872.*

## LIST of the PRINCIPAL DIVIDENDS PAID in VICTORIA DURING the MONTH ending OCTOBER 6, 1871.

| | | | |
|---|---|---|---|
| Australian Alliance Assurance Co. ... | at 10 per cent. and bonus 2s. per share ... | 8,000 | 0 0 |
| Melbourne Meat Preserving Co. ... | at 10 per cent. ... ... ... ... ... | 1,933 | 5 0 |
| | | £9,933 | 5 0 |

### ALLUVIAL.

| Names of Companies. | Amount per Share. | Date. | No. of Shares. | Dividend. |
|---|---|---|---|---|
| | £ s. d. | | | £ s. d. |
| Alma Consols, Maryborough ... .. | 0 2 0 | Oct. 6 | 6,000 | 600 0 0 |
| Annabella, Huntley ... ... | 0 1 6 | ,, 6 | 3,100 | 232 10 0 |
| Band and Albion Consols ... ... | 0 2 6 | Sept. 16 | 22,450 | 2,806 5 0 |
| Band of Hope, Maryborough ... ... | 0 2 0 | ,, 23 | 6,000 | 600 0 0 |
| Galatea, Scarsdale ... ... ... | 0 10 0 | ,, 16 | 2,100 | 1,050 0 0 |
| Gladstone, Haddon ... ... | 7 0 0 | ,, 30 | 40 | 280 0 0 |
| Golden Horn, Springdallah ... ... | 1 0 0 | Oct. 6 | 2,500 | 2,500 0 0 |
| Golden Lake, Springdallah ... ... | 0 6 0 | Sept. 30 | 4,400 | 1,320 0 0 |
| Golden Stream, Scarsdale ... ... | 0 10 0 | ,, 30 | 2,000 | 1,000 0 0 |
| Haddon, Haddon ... ... ... ... | 2 10 0 | ,, 16 | 64 | 160 0 0 |
| | 3 0 0 | ,, 30 | | 192 0 0 |
| Hand and Band, Ballarat ... ... | 0 2 6 | ,, 16 | 25,600 | 3,200 0 0 |
| Leviathan, Ballarat ... ... ... | 0 10 0 | Oct. 6 | 2,560 | 1,280 0 0 |
| Morning Light, Huntley... ... ... | 0 2 6 | Sept. 30 | 1,320 | 165 0 0 |
| Prince of Wales, Ballarat ... ... | 0 2 6 | Oct. 6 | 8,343 | 1,042 17 6 |
| Seaham, Maryborough ... ... ... | 0 1 0 | Sept. 23 | 6,000 | 300 0 0 |
| | 0 1 0 | Oct. 6 | | 300 0 0 |
| Wheal Kitty, Smythesdale ... ... | 4 10 0 | ,, 6 | 28 | 126 0 0 |
| | | | | £17,154 12 6 |

### QUARTZ.

| | | | | |
|---|---|---|---|---|
| | £ s. d. | | | £ s. d. |
| Albert, Diamond Hill ... ... ... | 0 0 3 | Sept. 23 | 24,000 | 300 0 0 |
| All Nations... ... ... ... ... | 0 5 0 | ,, 16 | 1,500 | 400 0 0 |
| Carlisle, Sandhurst ... ... ... | 450 0 0 | ,, 30 | 8 | 3,600 0 0 |
| Central Energetic, Lauriston ... ... | 0 7 6 | ,, 16 | 1,600 | 600 0 0 |
| | 0 7 6 | ,, 30 | | 600 0 0 |
| Central Garden Gully ... ... ... | 0 8 6 | ,, 16 | 2,000 | 850 0 0 |
| Central Garden Gully Tribute, Sandhurst ... ... ... ... ... | 0 6 6 | ,, 30 | 2,000 | 650 0 0 |
| Cornish, Daylesford ... ... ... | 10 0 0 | ,, 16 | 130 | 1,300 0 0 |
| | 10 0 0 | ,, 30 | | 1,300 0 0 |
| Cræsus ... ... ... ... ... | 0 0 3 | ,, 16 | 7,000 | 87 10 0 |
| Ellenborough, Sandhurst ... ... | 0 2 0 | ,, 30 | 600 | 60 0 0 |
| Extended Hustler's, Sandhurst ... | 0 2 0 | ,, 23 | 28,000 | 2,800 0 0 |
| | 0 1 0 | Oct. 6 | | 1,400 0 0 |
| Garden Gully Tribute, Sandhurst ... | 0 4 0 | ,, 6 | 23,750 | 4,750 0 0 |
| Garden Gully United, Sandhurst ... | 0 1 0 | Sept. 23 | 26,422 | 1,321 2 0 |
| | 0 1 0 | Oct. 6 | | 1,321 2 0 |
| G. G., Consolidated ... ... ... | 0 1 3 | Sept. 16 | 49,000 | 3,062 10 0 |
| Hercules, Sandhurst ... ... ... | 0 0 6 | ,, 30 | 28,000 | 700 0 0 |
| Ironbark, Sandhurst ... ... ... | 0 0 6 | Oct. 6 | 9,000 | 225 0 0 |
| Myrtle Creek, Sandhurst ... ... | 0 0 4 | Sept. 16 | 20,000 | 333 6 8 |
| | 0 0 4 | ,, 23 | | 333 6 8 |
| | 0 0 4 | Oct. 6 | | 333 6 8 |
| New North Clunes, Clunes ... ... | 1 0 0 | Sept. 23 | 2,056 | 2,056 0 0 |
| North Albion, Sandhurst ... ... | 0 0 6 | ,, 30 | 24,000 | 600 0 0 |
| North Cross Reef... ... ... ... | 0 18 0 | ,, 16 | 10,000 | 9,000 0 0 |
| North Garden Gully, Sandhurst ... | 333 6 8 | ,, 30 | 24 | 8,000 0 0 |
| North Johnson's, Sandhurst ... ... | 0 0 6 | Oct. 6 | 22,000 | 550 0 0 |
| Old Chum, Sandhurst ... ... ... | 0 2 3 | Sept. 23 | 27,000 | 3,037 10 0 |
| | 0 1 0 | Oct. 6 | | 1,350 0 0 |
| Old Chum Tribute ... ... ... | 0 0 1½ | Sept. 16 | 20,000 | 125 0 0 |
| Pandora Tribute ... ... ... | 0 0 6 | ,, 16 | 24,000 | 600 0 0 |
| Phœnix, Sandhurst ... ... ... | 5 0 0 | Oct. 6 | 11 | 55 0 0 |
| Pleasant Creek, Cross Reef ... ... | 1 2 0 | ,, 6 | 10,000 | 11,000 0 0 |
| Rainbow, Sandhurst ... ... ... | 0 1 6 | ,, 6 | 23,750 | 1,781 5 0 |
| Rose of Denmark, Sandhurst ... | 0 0 6 | ,, 6 | 24,000 | 600 0 0 |
| St. Mungo ... ... ... ... ... | 0 0 6 | Sept. 16 | 20,000 | 500 0 0 |
| Telegraph, Sandhurst ... ... ... | 35 0 0 | ,, 23 | 10 | 350 0 0 |
| | 30 0 0 | ,, 30 | | 300 0 0 |
| Unicorn, Sandhurst ... ... ... | 3 0 0 | ,, 23 | 24 | 72 0 0 |
| Union Tribute ... ... ... ... | 6 0 0 | ,, 30 | 24 | 144 0 0 |
| Unity, Sandhurst ... ... ... ... | 0 0 6 | Sept. 23 | 20,000 | 500 0 0 |
| | 0 0 6 | Oct. 6 | | 500 0 0 |
| Victoria Gold Mines, Sandhurst ... | 0 1 0 | Sept. 30 | 20,274 | 1,013 14 0 |
| Walhalla ... ... ... ... ... | 1 0 0 | ,, 16 | 600 | 600 0 0 |
| Wilson's, Marong... ... ... ... | 0 0 6 | ,, 30 | 32,000 | 800 0 0 |
| | | | | 70,861 13 0 |

| | |
|---|---|
| Dividends paid by Alluvial Companies ... ... ... ... ... ... ... ... | 17,154 12 6 |
| ,, ,, ,, Quartz ,, ... ... ... ... ... ... ... ... | 70,861 13 0 |
| ,, ,, ,, Companies other than mining ... ... ... ... ... ... | 9,933 5 0 |
| | £97,949 10 6 |

## DURING the MONTH ending NOV. 4, 1871.

| | |
|---|---|
| Colonial Bank of Australia, 8 per cent. per annum ... ... ... ... ... | £16,250 0 0 |
| National Bank of Australasia ... ... ... ... ... ... ... | 33,000 0 0 |
| | £49,250 0 0 |

### ALLUVIAL.

| | | | | |
|---|---|---|---|---|
| | £ s. d. | | | £ s. d. |
| Annabella, Huntley ... ... ... | 0 1 6 | Oct. 21 | 3,100 | 232 10 0 |
| Argyle, Linton's ... ... ... ... | 0 2 6 | ,, 21 | 3,200 | 400 0 0 |
| Band of Hope, Maryborough ... | 0 4 0 | ,, 21 | 6,000 | 1,200 0 0 |
| Galatea, Scarsdale ... ... ... | 0 10 0 | ,, 28 | 2,100 | 1,050 0 0 |
| Haddon Co., Haddon ... ... ... | 3 0 0 | ,, 21 | 64 | 192 0 0 |
| Haddon, Haddon ... ... ... ... | 2 10 0 | ,, 28 | 64 | 160 0 0 |
| Hand and Band, Ballarat ... ... | 0 2 6 | ,, 21 | 25,600 | 3,200 0 0 |
| Leviathan, Ballarat ... ... ... | 1 0 0 | ,, 28 | 2,560 | 2,560 0 0 |
| Lower Huntley Deep Lead ... ... | 0 2 6 | ,, 28 | 1,200 | 150 0 0 |
| Morning Light, Huntley ... ... | 0 8 0 | ,, 14 | 1,320 | 520 0 0 |
| | 0 2 0 | ,, 28 | | 132 0 0 |
| Park, Ballarat ... ... ... ... | 0 5 0 | ,, 14 | 12,800 | 3,200 0 0 |
| Prince of Wales, Ballarat ... ... | 0 2 6 | ,, 21 | 8,443 | 1,055 7 6 |
| Seaham, Maryborough ... ... ... | 0 1 0 | ,, 21 | 6,000 | 300 0 0 |
| | | | | £14,351 17 6 |

### QUARTZ.

| | | | | |
|---|---|---|---|---|
| | £ s. d. | | | £ s. d. |
| Alabama, Sandhurst ... ... ... | 50 0 0 | Nov. 3 | 12 | 600 0 0 |
| Carlisle, Sandhurst ... ... ... | 250 0 0 | Oct. 28 | 8 | 2,000 0 0 |
| Central Energetic, Lauriston ... ... | 0 5 0 | ,, 14 | 1,600 | 400 0 0 |
| Central Garden Gully Tribute, Sandhurst ... ... ... ... ... | 0 4 0 | ,, 28 | 2,000 | 400 0 0 |
| Clunes, Clunes ... ... ... ... | 3 0 0 | ,, 28 | 100 | 300 0 0 |
| Cornish, Daylesford ... ... ... | 7 10 0 | Nov. 3 | 130 | 975 0 0 |
| Costerfield Gold and Antimony ... | 0 5 0 | Oct. 14 | 2,000 | 500 0 0 |
| Extended Hustler's, Sandhurst ... | 0 1 0 | Nov. 3 | 28,000 | 1,400 0 0 |
| Freehold United, Hepburn ... ... | 0 2 0 | ,, 3 | 2,400 | 240 0 0 |
| Garden Gully Tribute, Sandhurst ... | 0 2 6 | Oct. 21 | 23,750 | 2,968 15 0 |
| | 0 1 0 | Nov. 3 | | 1,187 10 0 |
| Garden Gully United, Sandhurst ... | 0 1 0 | ,, 3 | 26,422 | 1,321 2 0 |
| G. and G. Consolidated, Sandhurst ... | 0 0 9 | Oct. 14 | 49,000 | 1,837 10 0 |
| Golden Fleece, Sandhurst ... ... | 0 2 0 | ,, 14 | 20,000 | 2,000 0 0 |
| | 0 3 0 | ,, 28 | | 3,000 0 0 |
| Great Gulf, Ballarat ... ... ... | 0 2 6 | Nov. 3 | 8,000 | 1,000 0 0 |
| Harbinger, Gipp's Land... ... ... | 0 1 6 | ,, 3 | 12,000 | 900 0 0 |
| Koch's Pioneer, Sandhurst ... ... | 0 1 0 | Oct 21 | 30,000 | 1,500 0 0 |

### QUARTZ—*continued.*

| Names of Companies. | Amount per Share. | Date. | No. of Shares. | Dividend. |
|---|---|---|---|---|
| | £ s. d. | | | £ s. d. |
| Lazarus, Sandhurst ... ... ... | 0 0 6 | Nov. 3 | 45,000 | 1,125 0 0 |
| Long Tunnel, Stringer's Creek ... | 3 0 0 | Oct. 14 | 2,400 | 7,200 0 0 |
| Myrtle Creek, Sandhurst ... ... | 0 0 3 | ,, 28 | 20,000 | 250 0 0 |
| New North Clunes, Clunes ... ... | 1 0 0 | ,, 28 | 2,056 | 2,056 0 0 |
| ,, ,, ,, and bonus... | 3 0 0 | ,, 28 | 2,056 | 6,168 0 0 |
| North Cross Reef, Pleasant Creek ... | 0 18 0 | Nov. 3 | 10,000 | 9,000 0 0 |
| North Gipp's Land, Walhalla ... ... | 0 5 0 | ,, 3 | 2,400 | 600 0 0 |
| Old Chum, Sandhurst ... ... ... | 0 0 6 | Oct. 21 | 27,000 | 6,750 0 0 |
| Pandora, Sandhurst ... ... ... | 0 1 0 | ,, 21 | 28,000 | 1,400 0 0 |
| Rainbow Tribute, Sandhurst ... ... | 0 0 6 | ,, 21 | 23,750 | 593 15 0 |
| | 0 1 0 | Nov. 3 | | 1,187 10 0 |
| United Happy Valley, Ovens ... ... | 0 5 0 | ,, 3 | 4,400 | 1,100 0 0 |
| Victoria Gordon, Egerton ... ... | 0 2 6 | Oct. 14 | 6,200 | 775 0 0 |
| Victoria, Sandhurst ... ... ... | 0 1 0 | ,, 28 | 20,274 | 1,013 14 0 |
| Walhalla, Gipp's Land ... ... ... | 6 0 0 | ,, 14 | 600 | 3,600 0 0 |
| White's No. 2 Tribute, Sandhurst ... | 0 0 3 | Nov. 3 | 25,000 | 312 10 0 |
| Wilson's, Marong... ... ... ... | 0 0 6 | Oct. 28 | 32,000 | 800 0 0 |
| | | | | £66,461 6 0 |

| | |
|---|---|
| Dividends paid by Companies other than Mining ... ... ... ... ... ... | 49,250 0 0 |
| ,, ,, ,, Alluvial Companies ... ... ... ... ... ... ... ... | 14,351 17 6 |
| ,, ,, ,, Quartz Companies ... ... ... ... ... ... ... ... | 66,401 6 0 |
| | £130,063 3 6 |

## DURING the MONTH ending DECEMBER 2, 1871.

### ALLUVIAL.

| Names of Companies. | Amount per Share. | Date. | No. of Shares. | Dividend. |
|---|---|---|---|---|
| | £ s. d. | | | £ s. d. |
| Annabella, Huntley ... ... ... | 0 1 0 | Nov. 17 | 3,100 | 155 0 0 |
| | 0 1 0 | Dec. 1 | | 155 0 0 |
| Argyle Co., Linton's ... ... ... | 0 3 0 | Nov. 17 | 1,800 | 270 0 0 |
| Band and Albion Consols, Ballarat ... | 0 2 6 | ,, 17 | 22,450 | 2,806 5 0 |
| Band of Hope, Maryborough ... ... | 0 2 0 | ,, 17 | 6,000 | 600 0 0 |
| | 0 3 0 | Dec. 1 | | 900 0 0 |
| Buninyong, Buninyong ... ... ... | 0 10 0 | Nov. 17 | 560 | 280 0 0 |
| Bute, Smythesdale ... ... ... | 7 0 0 | ,, 10 | 40 | 280 0 0 |
| | 6 10 0 | ,, 24 | | 260 0 0 |
| Duke of Cornwall, Ballarat ... ... | 0 2 0 | ,, 10 | 3,000 | 300 0 0 |
| Galatea, Scarsdale ... ... ... | 0 10 0 | ,, 24 | 2,100 | 1,050 0 0 |
| Golden Horn, Springdallah ... ... | 0 1 3 | Dec. 1 | 2,500 | 156 5 0 |
| Golden Stream, Scarsdale ... ... | 0 10 0 | Nov. 10 | 2,000 | 1,000 0 0 |
| Haddon, Haddon ... ... ... ... | 3 0 0 | ,, 10 | 64 | 192 0 0 |
| | 2 10 0 | ,, 24 | | 160 0 0 |
| | 2 10 0 | Dec. 1 | | 160 0 0 |
| Leviathan, Napoleon ... ... ... | 1 0 0 | Nov. 24 | 2,560 | 2,560 0 0 |
| Little Stream, Smythesdale ... ... | 12 10 0 | Dec. 1 | 14 | 175 0 0 |
| Morning Light, Huntley... ... ... | 0 5 0 | Nov. 17 | 1,320 | 330 0 0 |
| Seaham, Maryborough ... ... ... | 0 1 0 | ,, 17 | 6,000 | 300 0 0 |
| Telegraph, Huntley ... ... ... | 0 0 6 | ,, 24 | 24,000 | 600 0 0 |
| Try Again, Smythesdale... ... ... | 6 0 0 | Dec. 1 | 23 | 138 0 0 |
| United Hand and Band, Ballarat ... | 0 2 6 | Nov. 24 | 25,600 | 3,200 0 0 |
| | | | | £16,027 10 0 |

### QUARTZ.

| | | | | |
|---|---|---|---|---|
| | £ s. d. | | | £ s. d. |
| All Nations, Matlock ... ... ... | 0 5 0 | Nov. 17 | 1,600 | 400 0 0 |
| Carlisle, Sandhurst ... ... ... | 200 0 0 | ,, 24 | 8 | 1,600 0 0 |
| Central Garden Gully Tribute, Sandhurst ... ... ... ... ... | 0 3 0 | ,, 17 | 2,000 | 300 0 0 |
| | 0 4 6 | ,, 10 | | 450 0 0 |
| Cornish, Daylesford ... ... ... | 0 12 6 | ,, 17 | 1,300 | 812 10 0 |
| | 0 15 0 | Dec. 1 | | 975 0 0 |
| Cross Reef, Pleasant Creek ... ... | 1 0 0 | ,, 1 | 10,000 | 10,000 0 0 |
| Dividend Quartz Co., Steiglitz... ... | 0 2 0 | Nov. 10 | 3,000 | 300 0 0 |
| Eastwood's Quartz, Sandhurst... ... | 2 10 0 | ,, 17 | 1,000 | 2,500 0 0 |
| Freehold United, Hepburn ... ... | 0 2 0 | Dec. 1 | 2,400 | 240 0 0 |
| Garden Gully Tribute, Sandhurst ... | 0 1 6 | Nov. 17 | 23,750 | 1,781 5 0 |
| | 0 1 6 | Dec. 1 | | 1,781 5 0 |
| Garden Gully United, Sandhurst ... | 0 1 0 | ,, 1 | 26,422 | 1,321 2 0 |
| G. G. Consolidated, Sandhurst ... | 0 0 6 | Nov. 24 | 49,000 | 1,225 0 0 |
| Golden Fleece, Sandhurst ... ... | 0 1 0 | ,, 17 | 20,000 | 1,000 0 0 |
| Great Extended Hustlers, Sandhurst ... | 0 1 0 | Dec. 1 | 28,000 | 1,400 0 0 |
| Great Extended Hustler's Tribute, Sandhurst ... ... ... ... | 0 6 6 | Nov. 24 | 28,000 | 9,100 0 0 |
| Lazarus, Sandhurst ... ... ... | 0 0 6 | Dec. 1 | 45,000 | 1,125 0 0 |
| Long Tunnel, Stringer's Creek ... | 3 10 0 | Nov. 10 | 2,400 | 8,400 0 0 |
| Myrtle Creek, Sandhurst ... ... | 0 0 3 | ,, 17 | 20,000 | 250 0 0 |
| New North Clunes, Clunes ... ... | 1 0 0 | ,, 17 | 2,056 | 2,056 0 0 |
| North Cornish, Daylesford ... ... | 0 3 0 | ,, 10 | 3,000 | 450 0 0 |
| Perseverance, Rushworth ... ... | 0 0 3 | Dec. 1 | 24,000 | 300 0 0 |
| Rainbow Tribute, Sandhurst ... ... | 0 1 0 | Nov. 17 | 23,750 | 1,187 10 0 |
| | 0 0 6 | Dec. 1 | | 593 15 0 |
| Sailor Prince, Deep Creek ... ... | 24 0 0 | ,, 1 | 12 | 288 0 0 |
| Young Chum, Sandhurst ... ... | 0 0 6 | Nov. 17 | 20,000 | 500 0 0 |
| | | | | £50,336 7 0 |

| | |
|---|---|
| Dividends paid by Alluvial Mining Companies ... ... ... ... ... ... ... | 16,027 10 0 |
| ,, ,, ,, Quartz ,, ,, ... ... ... ... ... ... ... | 50,336 7 0 |
| | £66,363 17 0 |

## AUSTRALIAN AND NEW ZEALAND DIVIDEND GOLD MINES INVESTMENT COMPANY, LIMITED.

### No. 1 SERIES—FURTHER INVESTMENTS.

*Melbourne, December* 4, 1871.—Since writing last I have purchased Hope, Hercules, and Rose of Denmark shares, as per statement herewith, at the lowest prices ruling at the time. The other shares on your list are still above your limit in price, and there is nothing to justify me in advancing to present quotations, besides which, the market is more likely to fall than to rise this side of the new year. The last yield of the Rose of Denmark was small, but their deep ground prospects are very good. The Hercules holders are very firm, and the local men have such unbounded faith in the mine that I was induced to purchase when the opportunity occurred at 1*l.* 17*s.* Hope shares being under your limit, and hearing some better news from the mine, I took up a parcel of them also. They have about 600*l.* in hand towards the next dividend. The Hope Company has paid 5*s.* 6*d.* per share in dividends already this year. The Rose of Denmark has paid, in 1871, 6*s.* 3*d.* per share in dividends.

## EXTRACTS FROM DICKER'S AUSTRALIAN AND LONDON GAZETTE.

### TOTAL INVESTMENTS.—No. 1 SERIES.

| Date of Purchase. | Name and Locality of Company. | Number of Shares. | Rate per Share. | Total Amount. | | |
|---|---|---|---|---|---|---|
| | | | £ s. d. | £ s. d. | £ s. d. | |
| 1871. | | | | | | |
| Sept. 29 | New Moon G. M. Co., Bendigo ... ... | 120 | 0 19 0 | 114 0 0 | | |
| Oct. 3 | Do. do. do. ... ... | 100 | 0 19 0 | 95 0 0 | | |
| | | | | | 209 0 0 | |
| ,, 3 | Argus Co., Bendigo ... ... ... | 100 | 0 15 6 | 77 10 0 | | |
| ,, 5 | Do. do. ... ... ... | 200 | 0 15 6 | 155 0 0 | | |
| ,, 30 | Do. do. ... ... ... | 300 | 0 17 6 | 262 10 0 | | |
| | | | | | 495 0 0 | |
| ,, 3 | Central Energetic G. M. Co., Lauriston ... | 10 | 8 19 6 | 89 15 0 | | |
| ,, 6 | Do. do. do. do. ... | 20 | 8 15 0 | 175 0 0 | | |
| ,, 31 | Do. do. do. do. ... | 25 | 8 7 6 | 209 7 6 | | |
| | | | | | 474 2 6 | |
| ,, 3 | Victoria Gold Mines Co., Bendigo ... | 25 | 2 13 6 | 66 17 6 | | |
| ,, 5 | Do. do. do. ... | 100 | 2 13 6 | 267 10 0 | | |
| | | | | | 334 7 6 | |
| ,, 4 | North Specimen Hill G. M. Co., Bendigo ... | 400 | 0 4 4½ | 87 10 0 | | |
| ,, 4 | Do. do. do. do. ... | 500 | 0 4 4½ | 166 17 6 | | |
| ,, 5 | Do. do. do. do. ... | 400 | 0 4 4½ | 87 10 0 | | |
| ,, 7 | Do. do. do. do. ... | 400 | 0 4 4½ | 87 10 0 | | |
| | | | | | 459 7 6 | |
| ,, 5 | South Moon G. M. Co. (Graham's), Bendigo | 500 | 0 5 6 | 137 10 0 | | |
| Nov. 6 | Call on ditto ... ... ... ... | | 0 0 4 | 8 6 8 | | |
| | | | | | 145 16 8 | |
| ,, 21 | Hercules Quartz M. Co., Bendigo ... | 200 | 1 17 0 | 370 0 0 | 370 0 0 | |
| ,, 21 | Rose of Denmark G. M. Co., Bendigo ... | 400 | 0 17 0 | 340 0 0 | 340 0 0 | |
| ,, 25 | Hope G. M. Co., Wood's Point ... ... | 300 | 0 14 1 | 211 5 0 | 211 5 0 | |
| | | | | | 3,038 19 2 | |
| | PURCHASED IN ENGLAND. | | | | | |
| | Mariners' Reef Quartz Mining and Crushing Co., Maryborough .. ... ... | 500 | 1 0 0 | 500 0 0 | 500 0 0 | |
| | Total Investments to date ... | - - | - - | | £3,538 19 2 | |

The investments made this month, and which will be found included in above list, are—

| | £ | s. | d. |
|---|---|---|---|
| 200 Hercules, Bendigo, at 37*s.* .. .. | 370 | 0 | 0 |
| 400 Rose of Denmark, Bendigo, at 17*s.* .. | 340 | 0 | 0 |
| 300 Hope, Wood's Point, at 14*s.* 1*d.* .. .. | 211 | 5 | 0 |
| | £921 | 5 | 0 |

NOTE.—The quotations for the above shares are well maintained, North Specimen Hill especially being in demand at 8*s.* per share.

### NO. 2 SERIES.

The publication of the GAZETTE was delayed in the hope of giving some particulars of purchases in this venture. Unfortunately, however, the New Zealand mail will not be delivered until the beginning of February.

## THE MINES.

THE WINTER'S FREEHOLD GOLD MINING COMPANY, LIMITED, BALLARAT, VICTORIA, AUSTRALIA.—*Ballarat, 6th November*, 1871.—*Mine Reports.*—The reef in the main level is much softer, and better progress has been made. In the south level a rise was commenced on Thursday near the face of the drive, about 270 feet from the jump-up; it is now up 20 feet, and not through. The drives from Nos. 3, 4, and 5 rises are progressing favourably. From all appearances we have met the run from No. 1 Hand and Band. The water is rather heavy, and until the two drives ahead break through, we shall not be able to get away much wash-dirt. Coarse gold is seen in the face. Yield on Saturday, 55 oz. 8 dwt. Total for the week, 111 oz. 19 dwt. At No. 2 shaft the tributors have been carrying on a main reef drive to the north. A jump-up at the furthest point broke through on Friday into stiff red wash, similar to that worked by the No. 5 Consols. Yield for the week, 14 oz. 15 dwt.

*Ballarat, 13th November*, 1871.—The cross drive from No. 5 rise where the reef was lost has been stopped, and another opened, about 60 feet nearer the face of the main drive, which I expect will be deep enough to work the deep ground; the north-west drive is looking better, the reef is softer, and a much better-looking wash. The north-east drive is softer and much better for driving. South jump-up. The reef in the main drive is a little softer—a rise was put up near the face of the drive, and broke through at 35 feet into brown stiff clay, which proves it to be a very steep reef. I have commenced driving the reef again, which is much harder than it has been. Distance from jump-up, about 300 feet. Yield on Saturday, 20 oz. 10 dwt., total for the week, 44 oz. 4 dwt. Yield from No. 2 shaft, 19 oz. 9 dwt.

*Ballarat, 16th November*, 1871.—Yield on Wednesday, 26 oz. 6 dwt. The north-east drive from No. 5 rise is looking better. I obtained a much better prospect of gold to day than I ever got from No. 5 before.

*Ballarat, 20th November*, 1871.—*No. 5 rise.*—The reef in the north-west drive has dipped again. Another drive has been opened to go north-east. The main north-east drive is looking very well, reef soft, coarse gold to be seen during the last few days. It is 1450 feet in a direct line from the face to the point where the No. 1 Hand and Band ceased working, and our drives are most advantageously situated for operating upon the entire extent of this gutter. The main low level is in good-looking soft slate, very good driving country. Yield on Saturday, 36 oz., total for the week, 62 oz. 6 dwt. Yield from No. 2 shaft is 14 oz. 12 dwt.

*Ballarat, November 27th*, 1871.—*No. 5 rise.*—The ground further to the south-east has been tested by the drive from No. 3 rise. Two cross drives have been opened near the face of the north-east drive. If the reef continues soft there will be sufficient ground opened up in a fortnight from this date to put on four or five blocking faces. This ground will pay much better for blocking than it will for putting in main drives, as all the headings can be stowed away. Main drive is harder, but very good progress is being made by the contractors. So soon as the drives are sufficiently advanced several blocking-parties will be put on. It would not be advisable to increase the number of underground hands until the present drives are well in, as any increase below will necessitate a proportionate increase in the surface hands without a remunerative return. The various faces in washdirt are now looking very well, and in the course of another fortnight or so, a very considerable advance upon the present yields may be anticipated. Yield from No. 2 shaft for the week 14 oz. 11 dwt. Tributors are pushing on main drive towards No 5 Consols' working. No. 1 shaft.—Yield on Saturday 25 oz. 5 dwt. Total for the week 53 oz.

*Winter's Freehold.—No. 1 Shaft.*

| | | | | oz. | dwt. | gr. | oz. | dwt. | gr. |
|---|---|---|---|---|---|---|---|---|---|
| November | 8, 1871.—Yield | ... | ... | 23 | 14 | 0 | | | |
| ,, | 11 ,, ,, | ... | ... | 20 | 10 | 0 | | | |
| ,, | 15 ,, ,, | ... | ... | 26 | 6 | 0 | | | |
| ,, | 18 ,, ,, | ... | ... | 36 | 0 | 0 | | | |
| ,, | 22 ,, ,, | ... | ... | 27 | 15 | 0 | | | |
| ,, | 25 ,, ,, | ... | ... | 25 | 5 | 0 | | | |
| ,, | 29 ,, ,, | ... | ... | 43 | 4 | 0 | | | |
| December | 2 ,, ,, | ... | ... | 22 | 19 | 0 | | | |
| | | | | | | | 225 | 13 | 0 |
| | *No. 2 Shaft.* | | | | | | | | |
| November | 11, 1871.—Yield | ... | ... | 19 | 9 | 0 | | | |
| ,, | 18 ,, ,, | ... | ... | 14 | 12 | 0 | | | |
| ,, | 25 ,, ,, | ... | ... | 14 | 10 | 0 | | | |
| December | 2 ,, ,, | ... | ... | 6 | 10 | 0 | | | |
| | | | | | | | 55 | 1 | 0 |
| | Total for month | ... | ... | ... | ... | | 280 | 14 | 0 |

MARINER'S REEF QUARTZ MINING AND CRUSHING COMPANY (REGISTERED).—*December 6th*, 1871.—*Manager's Report.*—We are still getting on very fair with the shaft; we have seen no signs of quartz except one very small leader so far as we have gone, but are looking out for *the one that we have heard so much about.** There is no alteration in the cross-cut to note. Robson & Co. talk of giving over their tribute, but will sink 80 feet in Steele's old claim, providing the Company contribute towards it 10*s.* per foot, for half the gold, extending the period of the tribute to twelve months from the 1st of January next, tributors to keep four hands constantly engaged sinking the shaft. (Their terms have since been agreed to.) The stamps are in full work, and will be until after Christmas or perhaps the New Year. During the month ending November 25, the shaft was cut down a further depth of about 60 feet, making in all 101 feet, but to date it is about 120 feet. Roberts & Co. extended the east cross-cut a further distance of 7 feet, total from shaft, 147 feet 6 inches. Robson & Co. crushed 45 loads from North Mariner's for 9 oz. 4 dwt. 12 gr. gold. We have from 40*l.* to 50*l.* now due for crushing going on, besides 15*l.* still owing by the Bristol Hill Company. I think if we can cut down about 60 feet a month above the water, and from 40 to 50 feet below the water level, we shall do well. Langden (contributor for surface work) has only one hand with him while overhauling the engine, and is bringing his contract to a close. I hope to see four men on and sinking Steele's shaft deeper in a few days.

*Mine Report.*—The ground sunk through in shaft during the first 60 feet or so was soft sandstone, with a little slate at times, and very clear and free from quartz of any kind since that depth, and now we are going through a bastard kind of slate, very good for blasting, and of a brownish colour. A few days ago we went through a small leader, but not worth noticing; there is nothing peculiar in the ground. The timber is 9 inches by 8 inches for frame sets, and 4 feet 4 inches apart, and close stabbed behind each set there will be two divisions or centres at each set 9 inches by 3 inches, and a partition between the engine or pump shaft of boards. The ground in each cross-cut is sandstone and rather hard.

## THE LAURISTON MINES.

ABOUT three miles from Kyneton is the flourishing little gold mining settlement of Lauriston, and its proximity, if at first it is unsuspected by a visitor, so savours the talk of the former township as to make it sound strange and perplexing. But the visitor has only to drive northwards for a mile or so by the Mount Alexander road to have the mystery explained. If I add that when evening has closed in, and the last of the Kyneton conveyances duly dispatched, the elders of the village assemble round the blacksmith's fire to compare notes upon the events of the day, while the young men set up their wickets on a grassy flat by the river side, the reader will see that a Victorian gold field's township may resemble pretty closely, in its social aspects, an ordinary English hamlet. The chief difference is that while much of the talk in the latter would be about the inhumanity of Poor Law guardians and the tyranny of game-preserving squires, in the former every man has his tale to tell, if not of rich yields already obtained, then of golden prospects in the not distant future, for nearly everybody is in something which he believes to be good, and enjoys in anticipation that wealth which must be his when his turn comes.

THE CENTRAL ENERGETIC mine area is 462 feet in length, and has a shaft 210 feet deep. This Company commenced operations about the same time as the North Star; it has crushed 9769 tons of stone for 32,011*l.* worth of gold, and it has paid 12,600*l.* in dividends. It has never made any calls, it has no liabilities, and it has a credit balance at the bank. The claim adjoining to the south belongs to the Energetic Company, which consists largely of the same shareholders as the Central.

THE ENERGETIC mine is 400 feet in length, and its shaft is 245 feet deep. It commenced to work in June, 1869, and has crushed since then 7657 tons of quartz for 30,215*l.* worth of gold, of which 15,712*l.* has been paid in dividends. Here, again, no calls have been made, and there are no liabilities, but a comfortable sum in the bank. That these a mirable companies should have managed to get along without calls and without debt, will, no doubt, excite astonishment, as well as envy, in many minds, but the explanation is simple enough. Their stone paid almost, if not quite, from the surface, and the shareholders being experienced and industrious men, they managed to make the mines pay for their own exploration and erect their own machinery. The plant, which is the joint property of the two companies, and does the work of both, is now being extended. An additional 16½-inch cylinder engine is being erected to work new pumping and winding gear, and the companies' old engine, of 16-inch cylinder, will in future be able to devote its whole attention to a crushing battery of 16 stamp heads, which deals with the stone from both mines.

LAURISTON MINES.—The *Kyneton Guardian* reports:—

*Energetic Gold Mining Company, Lauriston.*—This Company has realised from the sale of gold 30 175*l.* 14*s.* 7*d.* in all. It has never made a call, but has paid in dividends and royalty 18,532*l.* 16*s.* 2*d.* From the 173 feet level upwards the stone crushed has averaged 1 oz. 8 dwt. to the ton, and there is a shaft down 230 feet, with chambers opened ready, to cross-cut at this level. There is a large body of paying stone in sight.

*Central Energetic Company, Lauriston.*—This Company has up to date obtained from its mine upwards of 27,000*l.* worth of gold, and paid in dividends and royalty 15,000*l.*, together with half the cost (with the Energetic) of crushing, pumping, and winding machinery. No call has ever been necessary.

*North Star, Lauriston.*—This Company is at present not working below. Gold has been obtained of the value of 15,600*l.*, out of which dividends and royalty to the amount of 6594*l.* have been paid.

BENDIGO MINES.—The *Bendigo Advertiser*, December 4th ult. remarks:—The amount of dividends paid during the past month was 26,331*l.*, which speaks well for the gold-producing character of the Bendigo quartz. Several very large cakes of gold have been sent in, and noticeably amongst these, one from the Great Extended Hustler's Tribute Company. It was the largest cake of gold ever seen on Bendigo—2564 oz., and the directors of the Great Extended Hustler's Tribute declared the largest dividend ever paid on Sandhurst—6*s.* 6*d.* per 28,000th share, equal to 9100*l.* This magnificent yield was obtained from 264 tons, so that the reef, which is 18 feet wide, averaged over 9 oz. to the ton. We imagine, after such a result, we can fairly lay claim to possessing one of the richest mines of the colony.

VICTORIA REEF GOLD MINES COMPANY, SANDHURST.—We have crushed for past fortnight 420 loads, yielding 243 oz. The shaft has been sunk 6 feet 6 inches, making a total of 537 feet. The north drive on the eastern reef at the 430 feet level has broken through the Hercules ground; the stone over the drive looking promising, and better returns may be expected. Additional batteries will be engaged. A dividend of 1*s.* per share has been declared, payable on Wednesday next.

VICTORIA GOLD MINES, SANDHURST.—The *Argus* of the 5th December ult., announces a dividend of 1*s.* per share.

HOPE GOLD MINING COMPANY, WOOD POINT, November 27.—Cleaned up on Friday, the 23rd inst.; yield, 86 oz. 11 dwt., of which 12 oz. 11 dwt. was from pyrites, and 74 oz. from 227 tons stone crushed Hope Reef. The stone to the left of rise has shown much better the last few days. On the right the contractors' block does not look very well, and the reef is very small. The 300 feet level on new reef has advanced 7 feet in the week. The new discovery is looking more promising; in some of the stone broken on Saturday gold was freely seen.

NEW MOON COMPANY, SANDHURST.—*Argus, November 27*, 1871.—Something should be heard from the New Moon Company very shortly; their new machinery is now completed, the engine being of 25-horse power, and it is expected that at least 1000 tons of stone can be raised weekly. The shaft is one of the finest in the district.

THE HERCULES COMPANY, SANDHURST.—A local work, published early in 1871,

* The quartz leader referred to we had forgotten all about until reminded by the above. The original owners of this part of the property when sinking the shaft in the early days, cut through a very rich leader which was nearly all gold. Being at the time bent upon reaching the main lode, the miners did not then follow up this leader, but continued with the shaft and timbered it up, since when in prosecuting mining operations on the main lode, the matter has been forgotten. We remember at the time to have seen a fine sample of specimens from the leader in question.—ED. A. & L. GAZETTE.

thus refers to this Company:—It holds two leases; area 16½ acres. One of the leases, 5 acres 3 roods and 30 perches; through this passes the Main Victoria, the Eastern Victoria, and the Hercules Reefs. They have in all 200 yards on the line of reefs. This is a registered Company, with a capital of 28,000*l.* in 28,000 shares, of 20*s.* each. There is a complete winding, pumping, and crushing plant, worked by two engines, one of 30-horse power pumping and crushing, with 12 head of stamps, and a 15-horse power engine for winding. The batteries are fully employed crushing their own stone, and it is in contemplation to erect other batteries. Depth of shaft 460 feet on the Hercules Reef, and on the Eastern Victoria Reef 450 feet; paying stone is being raised from the new south shaft at the 400 feet level, and the rich spurs so profitably worked by the Gold Mines Company are being driven for. The prospects of this Company are now better than they ever have been, and great confidence is felt that on sinking the shafts an additional 50 feet they will command the run on both reefs. Their tailings are rich in pyrites, and are let for three years at 17½ per cent.; the first operation on 8 tons gave 2½ oz. to the ton, and there is an unfailing supply of water; the stock commands high rates, and is, therefore, a favourite and scarce on the markets.

## GOLD AND THE GOLD-FIELDS.

(*Continued from page* 1.)

A fortunate find is thus recorded in the *Buninyong Telegraph* of November 8:—Yesterday a miner named P. Anderson picked up a nugget weighing about 9¾ lb. This was found just outside A. Boland's 42nd section paddock, at the top of the Alexandra Lead. It seems that Anderson and Foley were working there last week, but being unsuccessful Foley parted company with Anderson on Saturday. The nugget was found about 18 in. under the surface, among the roots of a sapling.

The reports of the Government mining surveyors and registrars which have just been published show that considerable improvement has taken place in mining during the quarter ending 30th September last, to which the reports refer. According to statistics furnished, the yield of gold in the quarter was 347,678 oz., of which 165,909 oz. was from alluvial diggings, and 181,769 oz. from quartz mines. The number of miners on the gold-fields was 58,506, of whom 27,026 were Europeans and 15,058 Chinese engaged in alluvial mining, and 16,333 Europeans and eighty-nine Chinese in quartz-mining. The value of all the machinery employed on the gold-fields was 2,097,689*l.*, and the number of square miles of auriferous ground worked upon was 950.

An interesting tabulated statement was published with the report, showing the depths at which payable quartz has been obtained in some of the deepest mines in the colony. The Temperance Company, Ballarat, obtained payable stone to a depth of 650 ft.; the Port Phillip Company, Clunes, to 690 ft.; the Portuguese Company, Steiglitz, to 866 ft.; the Collman and Tacchi Company, Sandhurst, to 720 ft.; the Perseverance Company, Waranga, to 510 ft.; the Eaglehawk Union Company, Tarrengower, to 450 ft.; the North Cross Company, Pleasant Creek, to 500 ft.; and the Good Hope Company to 620 ft.

The amount of Victorian gold exported during this year, up to the 2nd inst., was 1,312,191 oz., or 180,344 oz. over the quantity exported to the corresponding portion of last year.—*Argus.*

## THE THAMES GOLD FIELD, AUCKLAND, N.Z.

Owing to the non-arrival of the mail, *viâ* San Francisco, we are unable to furnish any later information.

## LIST OF DIVIDENDS FROM QUARTZ MINES.

*Extracted from* DICKER'S MONTHLY AUSTRALIAN AND LONDON GAZETTE.

| | | | £ | s. | d. |
|---|---|---|---|---|---|
| 4 weeks ending | June 18, 1870 | ... | 26,044 | 15 | 0 |
| ,, ,, | July 16, ,, | ... | 29,246 | 14 | 0 |
| ,, ,, | Aug. 13, ,, | ... | 34,471 | 10 | 0 |
| ,, ,, | Sept. 10, ,, | ... | 34,464 | 8 | 0 |
| ,, ,, | Oct. 8, ,, | ... | 34,875 | 4 | 0 |
| ,, ,, | Nov. 5, ,, | ... | 39,372 | 12 | 0 |
| ,, ,, | Dec. 3, ,, | ... | 41,682 | 14 | 0 |
| ,, ,, | Dec. 31, ,, | ... | 39,833 | 10 | 0 |
| ,, ,, | Jan. 28, 1871* | ... | 27,456 | 14 | 0 |
| ,, ,, | Feb. 25, ,, | ... | 43,816 | 14 | 0 |
| ,, ,, | Mar. 25, ,, | ... | 43,478 | 7 | 8 |
| ,, ,, | April 22, ,, | ... | 38,324 | 5 | 2 |
| ,, ,, | May 19, ,, | ... | 41,853 | 8 | 0 |
| ,, ,, | June 16, ,, | ... | 51,046 | 14 | 0 |
| ,, ,, | July 15, ,, | ... | 62,697 | 17 | 8 |
| ,, ,, | Aug. 11, ,, | ... | 63,290 | 11 | 11 |
| ,, ,, | Sept. 9, ,, | ... | 52,444 | 10 | 0 |
| ,, ,, | Oct. 7, ,, | ... | 70,861 | 13 | 0 |
| ,, ,, | Nov. 4, ,, | ... | 66,461 | 6 | 0 |
| ,, ,, | Dec. 2, ,, | ... | 50,336 | 7 | 0 |

* The holiday month.

*PLANS of the WINTER'S FREEHOLD & MARINER'S REEF GOLD MINES may be obtained on application at* 4, *Royal Exchange Avenue, E.C.*

## WINTER'S FREEHOLD GOLD MINING COMPANY, (Limited), BALLARAT, VICTORIA.

Freehold—Two Square Miles.

*Shares* 25*l. each.*

Liability limited to the amount of the Shares.

*Bankers.*

National Provincial Bank of England, Threadneedle Street, London.

*Resident Agent in London.*

THOMAS DICKER, Esq. (late Editor and Proprietor of *Dicker's Mining Record*, Melbourne), 4, Royal Exchange Avenue, E.C.

The Winter's Property has an area of 1359 acres 3 roods and 25 perches, or more than two square miles of freehold ground, on the Ballarat and Sebastopol plateau. Title, Grant from the Crown. No Royalty, tribute, or dues.

## MARINER'S REEF (GOLD) QUARTZ MINING & CRUSHING CO. (Limited), VICTORIA, AUSTRALIA.

Registered under the Mining Companies Limited Liability Act, 1864, of the Colony of Victoria, Australia.

Capital 50,000*l.* in Shares of 1*l.* each.

Shares held in the Colony - - 10,000 fully paid
Shares set aside for allotment in England - - - - - - - - 15,000 ,,
Shares held in reserve - - - - 25,000

No liability beyond the amount paid up.

AGENT IN LONDON.—THOMAS DICKER, Esq. (Late Editor of *The Mining Record*, Melbourne), 4, Royal Exchange Avenue, E.C.

The mill expenses do not exceed 5*s.* per ton, the Company owning a splendid battery of forty-four head of stamps, capable of reducing 1000 tons weekly, *so that with an average of only* 5 *dwts. per ton, the batteries when fully employed would give a profit of* 250*l. per week.*

The property is a very extensive one, comprising an area of nearly 90 acres, held from the Crown.

A large reservoir is on the lease, which is abundantly supplied with water, the embankment costing over 1000*l.*

The machinery is very comprehensive, the plant altogether being one of the most complete in the colony, and cost fully 15,000*l.*

There are about 100,000 tons of tailings on the ground, most of it the *débris* from operations when very rich stone was under treatment. A fairly selected sample of the pyrites was treated by Mr. Latta, of the Port Phillip Company, Clunes, who obtained a result equal to 2 oz. of gold per ton, a probable source of great profit when the proper mode of treating such material is ascertained.

## AUSTRALIAN & NEW ZEALAND DIVIDEND GOLD MINES INVESTMENT CO., Limited.

Capital £50,000, in Shares of £1 each.

In ten distinct Series of Investments of £5000 each.

BANKERS.—The London and County Bank, 21, Lombard Street, London, E.C.

SECRETARY.—THOMAS DICKER, Esq., Late Editor of Dicker's *Mining Record*, Melbourne, and Proprietor of the *Australian and London Gazette.*

OFFICES—4, ROYAL EXCHANGE AVENUE, LONDON, E.C.

*Vide Report of Investments, No.* 1 *Series.*

The principle of spreading an Investment over a number of different Stocks, has been attended with so much success in the working out of the Foreign and Colonial Government Trust, that it promises to become very generally followed. It is in fact a system of Insurance whereby one Stock is made to insure another. But if the principle be sound in regard to the less speculative class of Stocks, it is one that must especially commend itself for adoption by investors in gold mining properties, where, although enormous profits are frequently made, and the general average return is much higher than profits from other undertakings, there is still occasionally disappointment and loss from protracted delays, to which all Mines are more or less liable.

The large returns from Victorian Quartz Mines are proverbial. Numbers of them may be quoted which have given from ten thousand up to seventy thousand pounds in dividends during the past year.

The Thames River Gold Mines, Auckland, New Zealand, have been proved in point of productiveness fully as rich as any in Victoria.

| | In Dividends. | |
|---|---|---|
| The Shotover has paid - | £93,571 | within |
| The "Golden Crown" has paid - | 120,000 | the |
| The Long Drive ,, - | 77,980 | last |
| The Kuranui - - - - | 21,747 | three |
| The All Nations - - - - | 16,110 | years. |

The extraordinary yields of the Caledonian Mine have surpassed them all. *This mine has paid to its fortunate shareholders during the past year nearly Half a Million Sterling,* and is still giving equally large returns.

The whole of the Shares in the No. 1 and No. 2 Series have been allotted. A large proportion of the Shares in the No. 3 Series are already applied for.

## AUSTRALIAN AND NEW ZEALAND DIVIDEND PAYING AND PROGRESSIVE MINES.—

Full and reliable information, with list of sound mines for investment, may be obtained on application to Thomas Dicker (late Editor and Proprietor of "Mining Record," Melbourne), 4, Royal Exchange Avenue, London, E.C.

## AUSTRALIAN GOLD MINES.

The paying character of Australian Gold Mines has never before reached so high a point since the first discovery of gold in Australia, nor has the condition of mining affairs in Victoria certainly been more healthy than at the present moment. The test of averages shows that gold mining is at least as profitable as any, and far more so than most other kinds of industry, and already the exports of gold from Australia for the year 1871 are considerably in excess of the returns for the same period of 1870. Persons desirous of investing in Australian or New Zealand mining ventures may obtain the fullest information by applying to 4, Royal Exchange Avenue, London, E.C.

## DICKER'S AUSTRALIAN AND LONDON MINING AND GENERAL AGENCY.

4, ROYAL EXCHANGE AVENUE, LONDON, E.C.

List of Shares for sale in Australian and New Zealand Mines, under limited liability.

*Mariner's Reef (Gold) Quartz Mining and Crushing Company.*

*The Winter's Freehold Gold Mining Company, Limited, Ballarat, Victoria.*

*Australian and New Zealand Dividend Gold Mining Investment Company, Limited.*

*Golden Crown Gold Mining Company, Limited, Thames River, Auckland, N.Z.*

*The London and Thames River, N.Z., Golden Crown Company, Limited.*

*The Imperial Crown Gold Mining Company, Limited, Thames River, Auckland, N.Z.*

London: Printed by HEAD, HOLE & Co., 11 to 13, Harp Alley, Farringdon Street, and Ivy Lane, Paternoster Row, E.C., or RICHARD MIDDLETON and HENRY ENGLISH (the proprietors), at their office, 26, Fleet Street, E.C., where all communications are requested to be addressed.—Saturday, January 27, 1872.